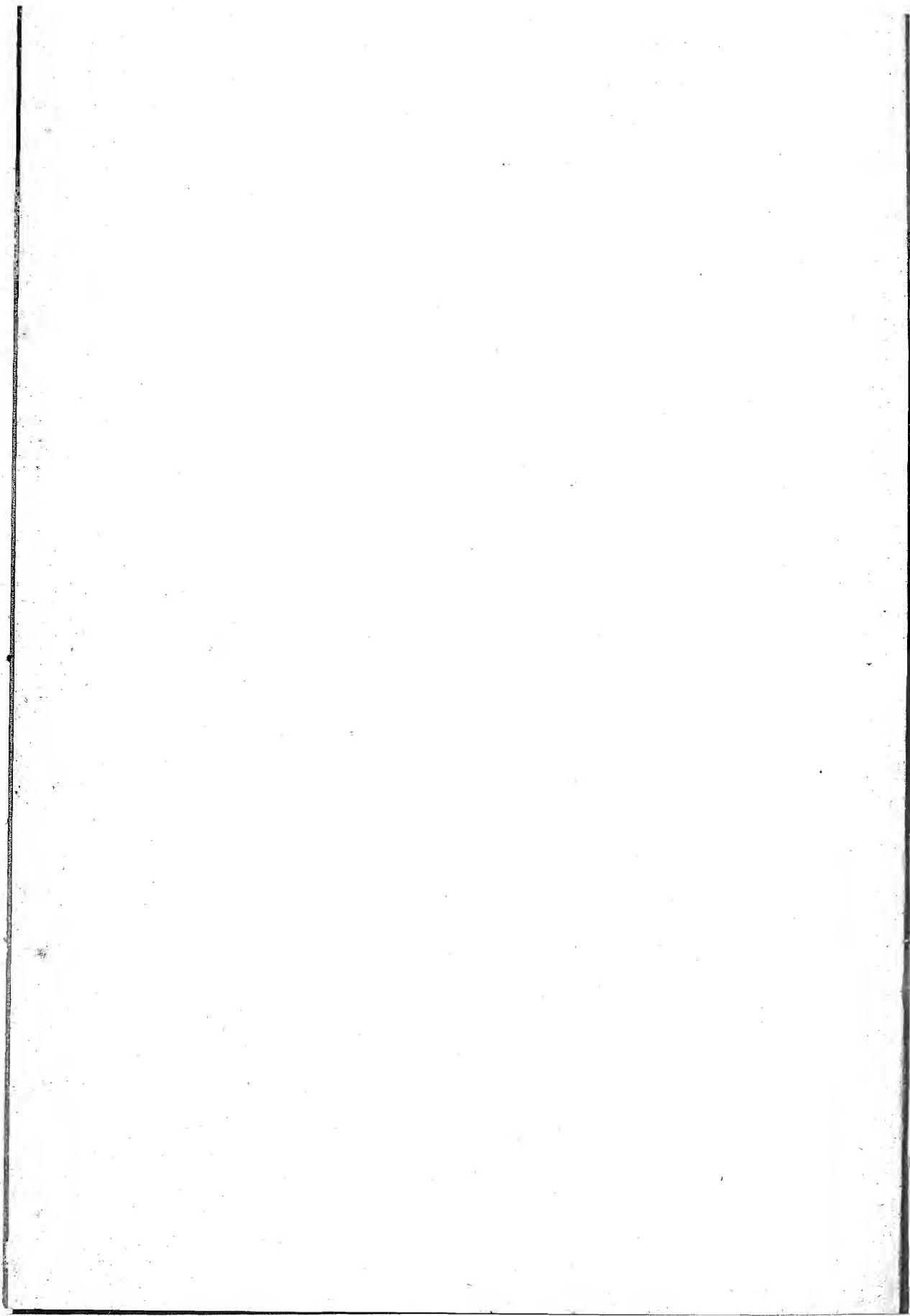


Japan: A Geographical View



AMERICAN GEOGRAPHICAL SOCIETY

SPECIAL PUBLICATION NO. 28

JAPAN

A Geographical View

GUY-HAROLD SMITH AND DOROTHY GOOD

The Ohio State University American Geographical Society

with the collaboration of SHANNON McCUNE

The Ohio State University



AMERICAN GEOGRAPHICAL SOCIETY

BROADWAY AT 156TH STREET

NEW YORK, N.Y.

1943

2234

COPYRIGHT 1943
BY
THE AMERICAN GEOGRAPHICAL SOCIETY
OF NEW YORK

CONTENTS

THE POSITION OF JAPAN IN THE WESTERN PACIFIC	1
GEOGRAPHICAL REGIONS	5
PHYSIOGRAPHY	8
CLIMATE	13
FORESTS	20
AGRICULTURE	23
FISHERY INDUSTRIES	30
MINERAL AND POWER RESOURCES	33
THE POPULATION PROBLEM	47
INDUSTRIAL JAPAN	56
FOREIGN TRADE	70
TERRITORIAL EXPANSION	86
LIST OF REFERENCES	93
INDEX	99
Plate I. Physiographic Map of Japan by Guy-Harold Smith (Scale: 1 : 4,000,000), with four inset maps <i>at end of book</i>	
Plate I, Verso. Population of Japan: Rate of Growth 1920-1935 by George Kiss (Scale: 1 : 2,600,000) <i>at end of book</i>	
Fig. 1. East Asia: Paths of Principal Ocean Currents, Area Subject to Typhoons, and Region of Their Greatest Destructiveness 14	
Fig. 2. Japan Proper: Principal Coal Mines, Petroleum Fields, and Iron Ore Mines 37	
Fig. 3. Japan Proper: Prefectural Boundaries 52	

TABLES

IA. Japan Proper: Mean Temperatures at Eight Representative Stations	16
IB. Japan Proper: Mean Rainfall at Eight Representative Stations	17
II. Japan Proper: Forest Area	20
III. Japan Proper: Forests . . . Ownership	21

CONTENTS

IV. Japan Proper: Value of Forest Products	23
V. Japan Proper: Agricultural Production	25
VI. Japan Proper and Great Britain: Consumption [of Food] per Head of Population	26
VII. Japan Proper: Classification of Agricultural Families by Property Status	27
VIII. Comparison of Productivity . . . in Agriculture in Certain Agricultural Countries	27
IX. Japan Proper: Average Daily Agricultural Wages	28
X. The Japanese Empire: Fishing Grounds and Value of Catch	31
XI. Japan Proper: Value of Manufactures and of Exports of Fishery Products . . .	32
XII. East Asia and India: Estimated Coal Reserves in 1911	34
XIII. The Japanese Empire: Coal Reserves and Production	36
XIV. East Asia and India: Estimated Iron Ore Reserves	43
XV. East Asia and India: Production of Iron Ore, Pig Iron, and Steel	44
XVI. Japan Proper: Official Population 1721-1852	47
XVII. Japan Proper: "Estimated Actual Population" 1872-1915	48
XVIII. Japan Proper: Total Population 1920 to 1940	49
XIX. Japan Proper: Proportions of Urban and Rural Population	50
XX. Japan Proper: Rates of Growth of Principal Urban Groups	50
XXI. Japan Proper: The Population of the Six Great Cities	50
XXII. Western Pacific Area: Population, Areas, and Densities	53
XXIII. Japanese Residents in Outer Parts of the Japanese Empire	54
XXIV. Japan Proper: Numbers Engaged in the Chief Kinds of Economic Activity . .	61
XXV. Japan Proper: Numbers Employed in Industry by Principal Groups	62
XXVI. Japan Proper: Industrial Groups Classified According to Numbers Engaged in Factories	63
XXVII. Japan Proper: Industrial Groups Classified According to Value of Output . .	63
XXVIII. Japan Proper: Industrial Groups Classified According to Capital Invested . .	63
XIX. Japan Proper: The Participation of Leading Manufacturing Industries in the Foreign Trade	64
XXX. Japan Proper and Karafuto: Value of Exports and Imports of Merchandise . .	70
XXXI. Japan Proper and Karafuto: Value of Foreign Trade by Commodity Groups .	73
XXXII. Japan Proper and Karafuto: Value and Principal Destinations of Leading Exports	74
XXXIII. Japan Proper and Karafuto: Value and Principal Sources of Leading Imports .	76
XXXIV. Japan Proper and Karafuto: Some Principal Trading Countries	78
XXXV. Japan Proper and Karafuto: Percentage Movement of Foreign Trade . . .	80

PREFACE

This book presents a view of Japan at the outbreak of the present war. It is essentially a book of facts—not of opinion or prophecy. Its purpose is to bring together information concerning the physical geography, resources, population, and economic life of Japan, and to point to connections between these basic conditions and the expansionism of Japanese military leaders. Without recognition of geographical and economic fundamentals of the type set forth in the following pages, opinion and prophecy are likely to be misleading.

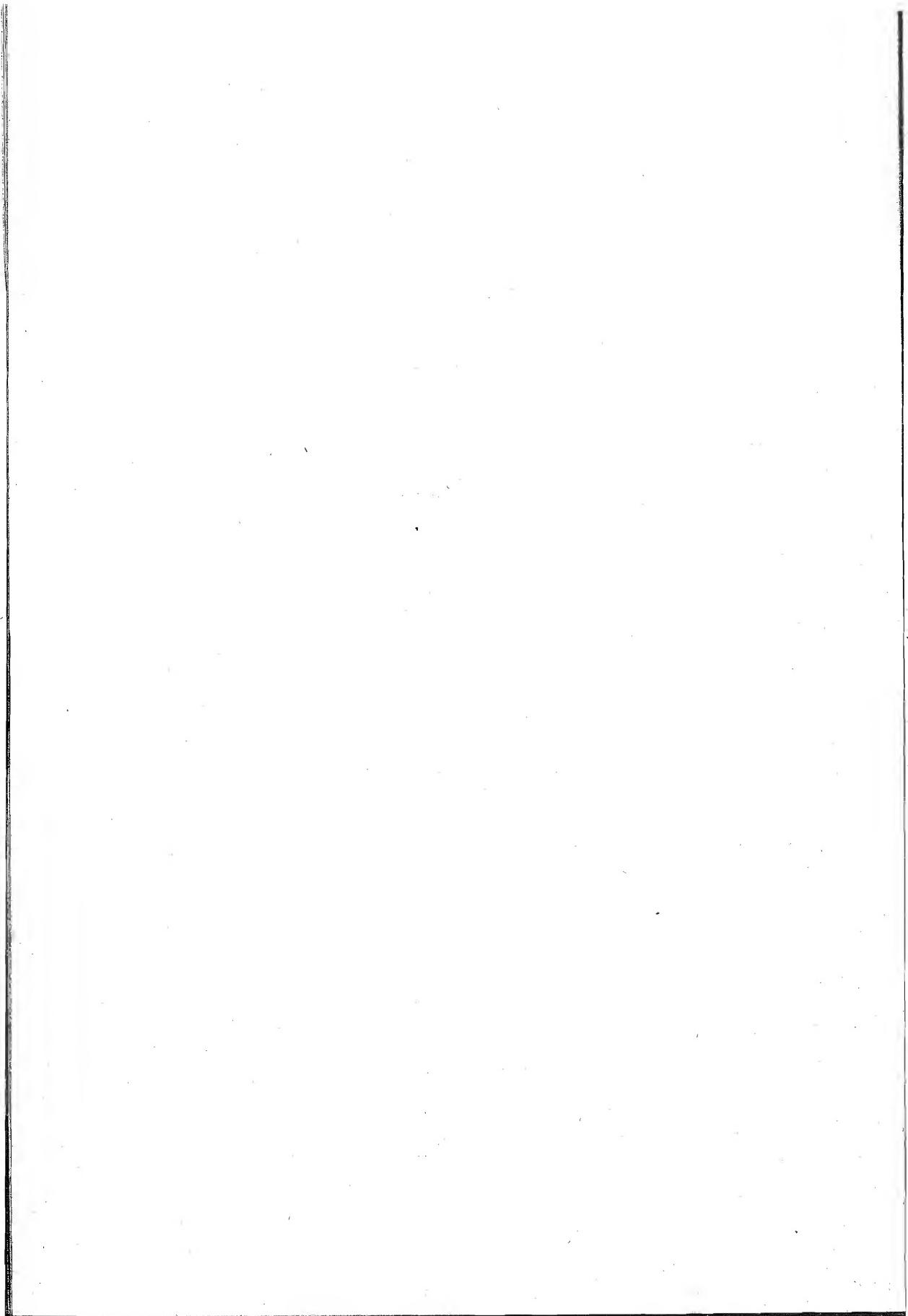
The text, tables, and maps are compiled from source materials (mostly in English) that are publicly available in the United States. The authors do not claim to have disclosed new facts nor have they striven for originality in their point of view. The merit of their study lies rather in its critical selection, convenient assembly, and clean-cut correlation of important, but hitherto widely scattered, data.

The volume was planned by Professor Smith and Dr. McCune, and the greater part of the initial work upon it was done by the former. Dr. Good added most of the statistics and was largely responsible for the chapters on economic conditions. She also edited the book and saw it through the press. The physiographic map is the work of Professor Smith; the map of population change is that of Dr. George Kiss; and the other maps were drawn by Mr. Stanley F. Smith of the American Geographical Society.

Grateful acknowledgement is made of courtesies and help rendered by Dr. Paul W. Icke of the Office of the Geographer, Department of State, by Mr. Stanley Gerr, and by the Institute of Pacific Relations. Valuable assistance was given also by the late Miss Elizabeth T. Platt, Miss Marion L. Eckert, and other members of the staff of the Society.

JOHN K. WRIGHT
Director

New York City
July 1, 1943



THE POSITION OF JAPAN IN THE WESTERN PACIFIC

An island empire of the western North Pacific, approachable only by sea or by air, Japan is today out of reach of Allied naval and air bases—and far out of reach, at that. The nearest bases of the first rank now in Allied hands are at Pearl Harbor, Puget Sound, and Sydney, 3,397 miles, 4,213 miles, and 4,328 miles, respectively, from Yokohama (see map, Pl. I).¹

The immensity of the Pacific Ocean and the relative positions of the lands surrounding it take on new meaning in global war. Modern invention constantly increases the range of fighting ships and planes, but it has not yet made negligible the factor of distance in this ocean, twice the size of the Atlantic and larger than the total land area of the world.

From the center of the Pacific, just west of Honolulu, virtually unbroken sea extends roughly 3,000 miles in every direction. The positions of the lands bordering the North Pacific can be most readily seen on the globe; for the usual map does not show that the arc of the northern coast lines of North America and Asia is so shallow as to form an almost straight line. This is why the direct route from San Francisco to Yokohama, the great-circle course, skirts the Aleutian Islands and is nearly 1,000 miles shorter than the route via Honolulu; it also explains why the sailing distance from Seattle to Yokohama is shorter than that from San Francisco.²

Hence, too, the commanding position of Yokohama—the first principal port to be reached by a steamer proceeding directly westward, the last at which an eastbound steamer would normally touch. Japan's position on established and potential air routes, however, is not of this uniquely favorable nature. Before the war, the trans-Pacific section of the east-west route round the world did not cross Japanese territory, and conceivably a northerly trans-Pacific route need not do so.

¹ On the map of the Pacific on Plate I the Miller Cylindrical Projection, a modification of the Mercator, has been used. On this the areas in latitudes remote from the equator are exaggerated to a less extent than on the Mercator projection. For discussion of it see Miller: Notes on Cylindrical World Map Projections, pp. 424-430.

For more detailed references to works mentioned in footnotes, see p. 93.

² The sailing distances in nautical miles (1 nautical mile = 1.15 statute miles) from Yokohama to several ports on the American side of the Pacific are: Kiska Harbor, Kiska Island, 1,977; Dutch Harbor, Unalaska Island, 2,551; Seattle, Washington, via Unimak Passage and north of Attu Island, 4,213; San Francisco, 4,536 direct or 5,488 via Honolulu; Panama, 7,682. These, as well as other sailing distances cited in this chapter, are taken from the *Table of Distances between Ports via the Shortest Navigable Routes*, H.O. No. 117, 1942. The true great circle courses may be plotted with the help of the *Great Circle Sailing Chart of the North Pacific Ocean*, H. O. No. 1282, January 1942.

The present security of the Japanese home fortress is no mere accident. The military implications of the proximity of the continent were long ago brought home to the Japanese by several attempted invasions, and the necessity of defense against sea power was fully recognized after 1853. Consequently, an outer ring of territory has been acquired bit by bit through the last fifty years—the Kurile and Bonin Islands, Formosa, Korea, Kwantung, Manchuria, and the South Sea Mandated Islands. As a result of this geopolitical foresight, Japan is now shielded from direct attack on every side except that facing the southernmost shore of Siberia.

In comparison with this strongly defended military position, Japanese economic defenses are more pregnable. Shipping provides the principal Japanese lifelines, and some of the most vital are far extended.³ The position of Japan off the continent of Asia is frequently compared to that of Great Britain and Europe, and there are, indeed, a number of similarities. Yet the differences are fundamental. One is that Japan is not vulnerable to a blockade of food supplies but is extremely dependent upon a steady flow of imported raw materials for the war industries. If the sea routes to the East Indies and Malaya were cut off, the lack of iron ore and petroleum would prove decisive.

In the present circumstances, the cutting of these supply lines by the Allies is a formidable task, calling for a coöordination of naval, air, and land forces in strength and the effective organization of supply lines at least twice as long as those of the defending forces.

The area of operations is limited by the location of naval and air bases,⁴ and the number of these in the Pacific cannot be greatly increased. Only

³ The Netherlands Indies, a source of indispensable supplies, are about as far from Yokohama as Gibraltar is from New York. Soerabaja, Java, is 3,092 miles, and Batavia 3,194 miles from Yokohama. Indo-China, Malaya, and Burma are other sources of vital supplies. Because of the difficulty of overland access to them from the north, they are rather like islands from the Japanese point of view. Their principal ports are many sailing miles from Yokohama. Saigon, Indo-China, is 2,419 miles away, or about as far as Reykjavik, Iceland, from New York. Singapore is 2,892 miles and Rangoon via Singapore is 4,001 miles away, or a little farther than Monrovia, Liberia, from New York.

⁴ Only those bases in the Pacific in existence in 1941 can be catalogued with reasonable certainty, as in the Royal Institute of International Affairs: *Bulletin of International News*, March 22nd, 1941, pp. 329-332. Those in Japanese hands at the time of writing (June 1943) are indicated by an asterisk.

THE UNITED STATES. *Major Naval and Air Bases*: Puget Sound (Washington), Mare Island (San Francisco), San Pedro (California), San Diego (California), Balboa (Panama), Pearl Harbor (Hawaii). *Smaller Naval and Air Bases*: Dutch Harbor (Alaska), Kodiak (Alaska), Sitka (Alaska), Cavite (Philippines),* Olongapo (Philippines),* Pago Pago (Samoa).

Other Important Air Bases: Port Barrow (Alaska), Fairbanks (Alaska), Anchorage (Alaska), Nome (Alaska), Tacoma (Washington), Sands Point (Washington), March Field (between Los Angeles and San Diego), Hamilton Field (San Francisco), Kaneohe Bay (Hawaii).

rarely are the requisite conditions found together: a strategic position, a large, safe harbor, landing space for sea and land planes, local fuel, water, and adequate food supply, and a defensible situation. Where the combination of all these is found, time is required to mount a fully equipped new base.

For the cutting of the Japanese supply lines to the Netherlands Indies and Malaya, possession of the Singapore base is fundamental. At present, the naval and air bases in Allied hands in the vicinity of the Netherlands Indies lie well to the west or southeast of Singapore: to the west, Colombo, Madras, and Calcutta are 1,572 miles, 1,583 miles, and 1,649 miles, respectively, from Singapore; to the east and southeast there are Port Darwin (2,161 miles), Thursday Island (2,465 miles), Sydney (4,219 miles), Pago Pago (5,299 miles), Pearl Harbor (5,881 miles), and Auckland (5,940 miles). The sailing distances from Singapore to the western bases are comparable to those from New York to points in the Lesser Antilles. The distance from Singapore to Colombo, for instance, is exactly the same as that from New York to St. John's, Antigua. To the east of Singapore, Port Darwin is approximately as far by sea as Colon is from New York, and the sea route

Bases for Fueling, Landing Grounds, Cable Communications, and Minor Naval Facilities in the Pacific Ocean: Midway Island, Johnston Island, Canton Island, Howland Island, Enderbury Island, Wake Island,* Guam,* Polloc (Philippines).*

GREAT BRITAIN. *Major Naval and Air Bases:* Singapore (Malaya),* Sydney (Australia).
Other Important Naval and Air Bases: Esquimalt (Canada), Hong Kong (China),* Port Darwin (Australia), Thursday Island (Australia), Auckland (New Zealand). There are many stations with some facilities in the South Seas.

JAPAN. *Naval and Air Bases:* Yokosuka,* Kure,* Sasebo,* Ominato,* Muroran,* and Maizuru* (all in Japan proper), Rashin (Korea).*

Smaller Naval and Air Bases: Port Arthur (Manchuria),* Paramushiro (Kurile Islands),* Port Lloyd (Bonin Islands),* Kilung (Formosa),* Takao (Formosa),* Pescadores Islands.

Other Good Harbors with Some Defenses: Spratly Islands (between Philippines and Indo-China),* Angaur (Pelew Islands),* Hainan (in the Gulf of Tongking),* Truk (The Marianas),* Saipan (Caroline Islands),* Jaluit (Marshall Islands),* Yap (Caroline Islands).*

FRANCE. *Main Naval and Air Bases:* Saigon (Indo-China),* Koh Kong (Indo-China).*

Minor Bases: Cam Ranh (Indo-China).*

Other Good Harbors: Kwangchouwan (Leased Territory),* Nouméa (New Caledonia).

THAILAND. *Small Naval Base:* Sata Hib.*

Good Harbor: Singora.*

NETHERLANDS INDIES. *Naval and Air Bases:* Sourabaja (Java),* Amboina (Celebes).* Many Air Bases at Rembang* and other points.

SOVIET UNION. *Main Naval and Air Base:* Vladivostok.

Other Bases: Commander Islands, Nikolaevsk, Petropavlovsk.

from Singapore to Sydney is only 100 miles shorter than that from New York to Murmansk.

There would seem to be three alternative methods of attacking the supply route: (1) approaching Singapore by sea from the west after the conquest of Burma, the Andaman Islands, and Sumatra; (2) approaching Singapore from the southeast after working through the southern islands of the Netherlands Indies, clearing the critical straits in succession;⁵ (3) advancing overland from the continent farther north, i. e., retaking Burma, cutting through China to Canton and Hong Kong, and taking Formosa.

A quite different plan of campaign, which might be executed simultaneously, envisages an attack upon the Japanese Islands from the north based upon the Aleutians. Here the weather hazards and the lack of local food supply would have to be overcome and the coöperation of Russia enlisted.

Discussion of strategy, however, lies beyond the scope of this study. Nor does this little book set out to describe the Japan of 1943 engaged in war against the Allies. Rather it attempts to portray the essential Japan on the eve of the conflict. One reason for this limitation is the difficulty of getting recent information. Another and more compelling reason is the desire to trace the fundamental constituents of the Japanese economy upon which there must be constructed the Japan of the future.

⁵ Torres Strait, 2,465 miles from Singapore; Wetar Passage, 1,630 miles; Lombok Strait, 973 miles; and Sunda Strait, 538 miles.

GEOGRAPHICAL REGIONS

Japan proper consists principally of the islands of Hokkaido, Honshu, Shikoku, and Kyushu.¹ Within these islands there are a number of distinctive geographical regions, which may be organized into four major divisions (see map, Pl. I).

1. *Hokkaido*, the northern island, has an area of 34,276 square miles,² a little larger than that of Maine. Nearly all of it lies north of the forty-second parallel, and the cold winters, mountainous surface, and extensive forests give the landscape an austere aspect. The building of railroads after 1880 opened Hokkaido to settlement, but the Japanese, who have never liked migration into cold areas, have been slow to penetrate the tree-covered wilderness. Although the best land is cleared, stumps remain in many places, testifying to the recency of settlement. The forests supply lumber and pulp, and the mines, coal to be shipped southward to industrial Honshu. Gradually, in spite of the northern latitude, there has been developed an agricultural economy based upon the cultivation of rice, but with sufficient diversification to include the usual crops of higher middle latitudes: corn, barley, buckwheat, oats, rye, wheat, beans, potatoes, and flax.

2. *Ou* lies in that part of Honshu north of the thirty-seventh parallel and is intermediate in position and geographical character between Hokkaido and subtropical Japan. The relief has an approximately north-south trend. The mountains are high enough to make the winters cold, but summers are warm and fairly moist. The east coast is bathed by the cool Oyashio Current, and the warm Kuroshio Current moderates the temperature of the western side. The original deciduous forest has been cleared from the lowlands. Rice is the principal crop; the cultivation of tea reaches its northern limit in southern Ou; the mulberry ranges farther but not into the northernmost part. Agriculture is limited to one summer crop, with occasional use of rice land for a second sown in the fall.

Northern Honshu has not participated much in the expansion of manufacturing characteristic of southern Japan. The urban centers of Ou are small, and its agricultural population is not dense.

3. *Chubu* lies across central Honshu from the Pacific to the Japan Sea.

¹ Officially Japan proper also includes many small islands, which have an area of 921 square miles and a population of 575,000 (1940).

² Areas have been converted into square miles from the data in the *Resumé Statistique de l'Empire du Japon, 1940*, which are based on reports of the Government-General Topographic Service. The area of inland waters is included.

The Pacific coast line is deeply indented; broad alluvial plains extend from the sea to bordering hills; high mountains dominate the interior. The plains are well watered and the mountains forested. The subtropical climate makes possible complete use of the arable land, and multiple cropping is general.

Tokyo (Kwanto) Plain, the chief subdivision of the region, supports over 14 million people. The city of Tokyo is the third largest in the world. Since 1869 it has been the capital of Japan, and it has become, together with Yokohama, the great center of trade. The manufacturing developed around it is based upon hydro-electric power from the mountainous interior and coal from Hokkaido and Kyushu.

Nagoya is an old city at the head of Ise Bay. Its central position has favored industrialization, and a wide variety of commodities, such as textiles, metal products, porcelain and pottery, and cement, are manufactured thereabouts.

Among the mountains of the interior there are other alluvial plains utilized for agriculture and local industry, especially for the cultivation of mulberry trees and the production of raw silk.

4. *Southwestern Japan* may be considered as two geographical regions: one, the narrow, mountainous outer zone which borders the Pacific; and the other, the broad inner zone. The first is economically unimportant in spite of the warm, humid climate. Because of the ruggedness, activity is confined to small lowlands, and remoteness places the region at a disadvantage commercially.

The inner zone includes all of Honshu west of Chubu together with northern Shikoku and northern Kyushu. The integrating feature is the Inland Sea. The culture and economy of Japan were formerly centered at its eastern end, today a principal industrial region. Its lowlands comprise the Kinki District, where Osaka, Kyoto, and Kobe, three of the six great cities of Japan, are located. There are now metallurgical and chemical industries in this district, which used to be famous chiefly for textiles, ceramics, foodstuffs, and wood and paper products.

Around the subtropical Sea a dense rural population cultivates the fertile soil intensively. The adjacent waters are also an important source of food, and fishing villages are numerous.

At the western entrance to the Inland Sea, in northern Kyushu opposite the Strait of Shimonoseki, there lies another industrial region, where Yahata (Yawata), the tenth largest city of Japan (261,309 in 1940), is the

metallurgical center in a cluster of iron- and steel-producing districts near the local coal resources. Delivery of steel and finished products to the industrial cities in the east can be made along protected water routes.

The islands of Japan proper, rising from the western Pacific, present a landscape in which mountains and sea merge. Even inland mountains often appear to be standing in water, because of irrigation at their bases. Rugged or symmetrical, largely forest-covered, and overlooking intensively cultivated lowlands, they give the Japanese landscape its essential character.³

The area of Japan proper, 147,707 square miles, is less than that of France, Germany, or California. The area of the Japanese Empire, including Karafuto, Korea, Formosa, the Kurile chain, and numerous small islands, is approximately 260,769 square miles. The leased territories of Kwantung and the South Manchurian Railway Zone and the mandated islands in the South Seas bring the total area officially administered by the Japanese Empire to about 263,050 square miles or slightly less than the area of Texas. Apart from the lands conquered since 1930, the imperial territory is relatively small. It was regarded by the territorial expansionists as much too small for a vigorous nation.

³ Haushofer: *Japan* . . . p. 57.

PHYSIOGRAPHY

From Cape Horn to Australia high mountain ranges of relatively recent (Tertiary) geological formation encircle the Pacific Ocean.¹ On the eastern, or American, side these lie along the continental margin. On the Asiatic, side the mountains rise out of the sea as island arcs. By way of the Aleutian Islands an arc of mountains bends westward toward the Asiatic mainland; another arc extends from peninsular Kamchatka southward through the Kurile (Chishima) Islands to Hokkaido, there intersecting still another which reaches southward from Karafuto through Japan proper and the Lyuchyu (Ryukyu) Archipelago to Formosa (Taiwan); farther south, in the Philippines and the East Indies, the curving ranges are repeated. In a frequent characterization of their arc-shaped alignment, these islands are likened to great festoons draped off the east coast of Asia.

The islands of Japan proper are a complex system of such mountains and associated landforms, the area above sea level being more extensive and topographically diversified than in the Kurile Islands and the Lyuchyu Archipelago near by, where only the mountain summits show above water. The youth of the Japanese mountains is manifest in earthquakes and volcanoes. Although only 60 of the more than 500 volcanoes scattered through the Empire have erupted within historical record,² they were very active in quite recent geological time. Great quantities of volcanic ash are associated with the water-laid deposits of the Quaternary period.

THE MAJOR PHYSIOGRAPHIC DIVISIONS

Structurally Japan may be divided into parallel zones of unequal width extending from Hokkaido southward and southwestward to Kyushu: a narrow Outer Zone along the Pacific margin of the islands and a broad Inner Zone on the continental side (see map, Plate I). In central Honshu they are cut transversely by major fault lines, which form a great trough called the "Fossa Magna," now largely filled with later strata and volcanic material. By dividing the Inner and Outer Zones each into two sections and considering the Fossa Magna a separate province, it may be said that Japan proper consists of five geomorphic regions. The following description of these regions will deal chiefly with their mountains and related highlands,

¹ Much of the material in this section is based upon Trewartha: A Reconnaissance Geography of Japan, and Hall and Watanabe: Landforms of Japan. For condensed statements, see Trewartha: Notes on a Physiographic Diagram, and Stamp: Asia, pp. 582-586; 618-630. For note as to maps giving place names, see p. 98.

² Watanabe: On the Distribution of Volcanoes . . . pp. 433-436.

which cover three-quarters of the area of the country. The plains and lowlands will then be described separately.

1. *The Northern Outer Zone.* In Hokkaido the Outer Zone includes all of the island except the southwestern peninsula and the Ishikari-Yufutsu plains. The southern range, the Hidaka, resembles the mountains of northeastern Honshu. In central Hokkaido, a continuation of the arc of the Kurile Islands transects the older mountains, and volcanic features, like those of the younger islands, replace the erosional terrain.

In northern Honshu the Outer Zone consists of two elongated mountain areas. One of these, known as Kitakami, lies to the north, and the other, Abukama, to the south of Sendai on the east coast.

The present rugged terrain, a complex of metamorphosed igneous rocks and older sediments with later intrusives, retains remnants of an erosional surface deformed by warping and faulting during uplift.

2. *The Northern Inner Zone.* The Inner Zone of northern Japan extends from the narrow peninsula of southwestern Hokkaido through a wide area in Honshu to the Fossa Magna. In Honshu it consists of two parallel mountain areas separated by linear alluvial basins. Both ranges are made up of structural blocks and domes elevated to heights of 5000 to 7000 feet and deeply dissected by short, swift streams. The central range serves as the drainage divide for 300 miles; the western range is cut into fragmentary chains by westward flowing streams. Between each set of drainage systems the two principal ranges are joined by a transverse ridge. The Kwanto mountain area of the southern part exhibits a more mature topography.

3. *The Fossa Magna* transects the center of Honshu and of the island arc of which it is a part, as if the outer ends of the arc had been bent backward until a great fracture appeared. Later volcanism has filled in the break to a considerable extent; and the volcanoes of the Fuji chain, including the famous Fujiyama, are now the most conspicuous features. Along the base of the adjacent mountains the boundary of this zone is marked by a series of well defined structural basins.

4. *The Southwestern Outer Zone.* The southern parts of Honshu, Shikoku, and Kyushu comprise this zone, together with a wedge which projects northward in central Honshu, culminating in the Akaishi Mountains, high above the Fossa Magna to the east. The principal mountain area, a series of parallel ranges and intervening valleys known as the Pacific Folded Mountains, has the same general trend as the province. They are composed of crystalline schists and highly metamorphosed sedimentary rocks.

5. *The Southwestern Inner Zone.* Extending from the Fossa Magna through Honshu to its southwestern tip, this zone also includes northern Shikoku and northern Kyushu. The major part consists of elevated blocks intricately dissected to produce a rather hilly terrain. The area is underlain by ancient sedimentary formations, subsequently disturbed by granitic intrusions, later leveled by denudation, and again subjected to fracturing. The later crustal deformation resulted in the local elevation of certain areas above the general upland level, particularly in the Hida Range (the Japanese Alps), which rises to 10,000 feet above sea level, its height accentuated by the steep eastward descent to the Fossa Magna. Elsewhere blocks have been depressed, creating structural basins. The Inland Sea is the result of the partial submergence of a depressed block, which must have been very irregular in its surface configuration. The Japanese have taken advantage of the easily guarded, narrow entrances of the Sea to establish a naval base at Kure and to locate important war industries at the eastern end.

THE LOWLAND AREAS

Throughout these zones there occur lowland plains and terraces of primary importance in the human geography of Japan. Although they occupy only about one-fourth of the area of the country, the plains support most of the agriculture and settlement. They warrant consideration in some detail.

The major ranges and highlands are separated by structural basins which show a marked alignment with the mountain features. Apparently the initial mountain-building processes which depressed these blocks were stilled sufficiently long to permit the basins to be partially filled with debris from the mountains. Where the turbulent streams first reached the plains, coarse sands, gravel, and even boulders were deposited. Farther out, finer sands and silts were laid down. The alluvial plains thus formed were not of uniform elevation, those lying within the mountains being higher than those by the sea. Later, when a resumption of the mountain-building process, with accompanying volcanism, was uplifting the islands of Japan, a new cycle of erosion was initiated. The streams, which had been flowing sluggishly across the alluvial plains, were rejuvenated. Much of the alluvial material was cut away and moved seaward to produce new, lower alluvial plains. Its removal left behind a series of terraces of the older alluvium (shown by more open stiple on Pl. I), which are drier than the low lying, well watered alluvial plains (closer stiple on Pl. I). These terraces make up about one-third of the lowland area of Japan.

In Hokkaido the large, triangular mountain area to the east is separated from the southwestern peninsula by the Ishikari-Yufutsu Lowland, which cuts across the island from northwest to southeast and sends a narrow finger north into the mountain mass. This irregular plain is a partially filled structural depression, the largest lowland in Hokkaido. It is poorly drained, and its principal stream, the Ishikari, winds in a meandering course. Because of the swampy character of the land near the stream and its northern location, little of the area has been reclaimed for agricultural purposes.

In eastern Hokkaido, to the north and south of the chain of volcanoes which extends from the Kurile Islands to the Hidaka Mountains, plains of alluvium and volcanic ash slope seaward. The higher portions are dissected by short streams along which swampy alluvial lands are characteristic. In low lying portions, finer coastal plain sediments merge into the alluvium.

In northern Honshu where the Inner and Outer Zones make up three mountain ranges parallel with the structural alignment of the island, there are two natural depressions, flooded by detritus, in the interior between the ranges; and along the western side of the island a series of coastal plains forms a third lowland, similarly aligned although discontinuous.

In the more easterly of the two depressions there are a number of separate lowlands. In the north, the Mutsu alluvial plain slopes from the Central Mountain Range to the Pacific, its seaward margin marked by a crescentic beach. To the south, the Kitakami Lowland consists of a long, narrow northern part which ultimately widens into the broad Sendai Bay, and a southwestern part of alluvial fans trenched by eastward flowing streams. Farther south, the Abukama Lowland includes the Fukushima Valley and the Koriyama intermontane basins, which are similar to those near the sea.

In the central depression lying immediately to the west of the Central Mountain Range, there is a series of nine, small, discontinuous intermontane basins which need not be identified by name. The combination of drier alluvial terraces and wet alluvial lowlands is an essential feature.

In the third lowland, a series of plains along the western coast of northern Honshu, the structural basins have been filled and built seaward until the coast line has become relatively smooth. The coastal margin of the Echigo (Niigata) Plain, the largest of the series, is marked by parallel beach ridges capped by dunes piled up by the strong winds off the Japan Sea. The sediments consist of water-laid deposits, with volcanic ash in great quantities locally. Inland from the coastal ridges there are some areas of low, wet alluvial plain devoted to rice growing; nearer the mountains drainage is better.

The Tokyo Plain, the largest lowland in the country, lies in the southeastern part of the northern Outer Zone. Made up of a thick series of unconsolidated sediments deposited in a structural depression, its surface rises from near sea level to elevations ranging from 65 feet to 165 feet, the low areas consisting of recent alluvium and the higher, of older alluvial deposits with a veneer of volcanic ash. Near the mountains the plains take on the character of alluvial fans.

In the Inner Zone of southwestern Japan there is an extensive irregular plain at the head of Ise (formerly Owari) Bay. The largest section lies to the north of the Bay, but alluvial deposits have extended both the eastern and western margins seaward. The occurrence of plains at the heads of bays is again illustrated in the Kinki District at the eastern

end of the Inland Sea by Osaka (Settsu) Plain, which opens into Osaka Bay. A series of other alluvium-filled fault basins—the Yamato (Nara) Basin, the Yamashiro (Kyoto) Basin, and the Biwa (Omi) Basin—forms a nearly continuous lowland from Osaka Bay to the Japan Sea. The Biwa Basin, containing Lake Biwa, is separated from Wakasa Bay by a narrow ridge.

Westward along the shores of the Inland Sea, in an area known as the Central Setouchi, the plains become small and irregular—inadequate for agricultural needs; intensive use of the land has consequently been extended into the more rugged borderland. Along the northern shore of Shikoku the plains are small and similar in character to those north of the Inland Sea. At the eastern end of Shikoku the long, narrow Yoshino Rift Valley follows the great fault line which here separates the Outer and Inner Zones.

In Kyushu the plains consist mainly of alluvial fragments scattered around the irregular coast. The largest, the Tsukushi Plain, fronts upon the northern end of the Ariake-no-umi, another inland sea caused by submergence, in the western side of the island. In Kyushu, as in other parts of Japan, the low lying plains are of first importance for both agricultural and industrial purposes.

CLIMATE

Within the main islands of Japan proper, which extend from 31° N. to 45° N., there is a gradation from a humid subtropical climate to a humid continental type. The mild winters of the southwestern coasts, where two crops of rice may be grown in a single year, contrast with the bitterly cold winters of Hokkaido. Precipitation is sufficient for agriculture throughout Japan, although the regime of rainfall differs from place to place. There is distinct seasonality in both temperature and precipitation; and departure from the normal may cause serious damage to crops.

Seasonal differences in temperature caused by insolation in these latitudes are accentuated by the nearness of the Japanese islands to the mainland of Asia and their position in the path of the continental monsoons. During the summer a low pressure area develops over Mongolia while pressure over the western Pacific is relatively high; hence, warm moist air passes over Japan as it drifts toward the interior of the continent, and the weather is marked by oceanic winds blowing from the south and southeast. During the winter the situation is reversed; a high pressure area develops over the continent, and great masses of cold dry air drift out to the relatively warm Pacific Ocean. The prevailing winds across the Japan Sea are then from the northwest.

Winters are less severe in Japan proper than on the nearby continent partly because the elongated islands lie between two streams of the warm, northward flowing Kuroshio (Japanese) Current, which forks south of Kyushu; the main stream then swings northeastward along southern Japan and across the Pacific, and a branch passes through the Korea (Tsushima) Strait and northward along the western coast of Honshu. In the Japan Sea at about 40° N. it meets a branch of the cold, southward flowing Oyashio (Okhotsk) Current of which the main stream, following the eastern coast of Hokkaido and northern Honshu, meets the main Kuroshio current in the Pacific. The cold waters of the Oyashio Current chill the shores of all northern Japan (see Fig. 1).

Cyclonic storms typical of these latitudes frequently pass over the Japanese islands, causing non-periodic changes in the weather. Many of the disturbances move out from the continent by way of the Yangtze Valley; others originate in northern Asia. As the storms cross the Japan Sea they commonly swing northeastward and sometimes stagnate above the islands, the central mountain ranges of Honshu marking the front between warm moist air from the south and the cooler mass of air from the west or north-

west. The conjunction of mountainous terrain and convectional activity produces heavy rainfall. These cyclonic storms are more strongly developed in spring and autumn, although they are an important factor in the weather at all times of the year.

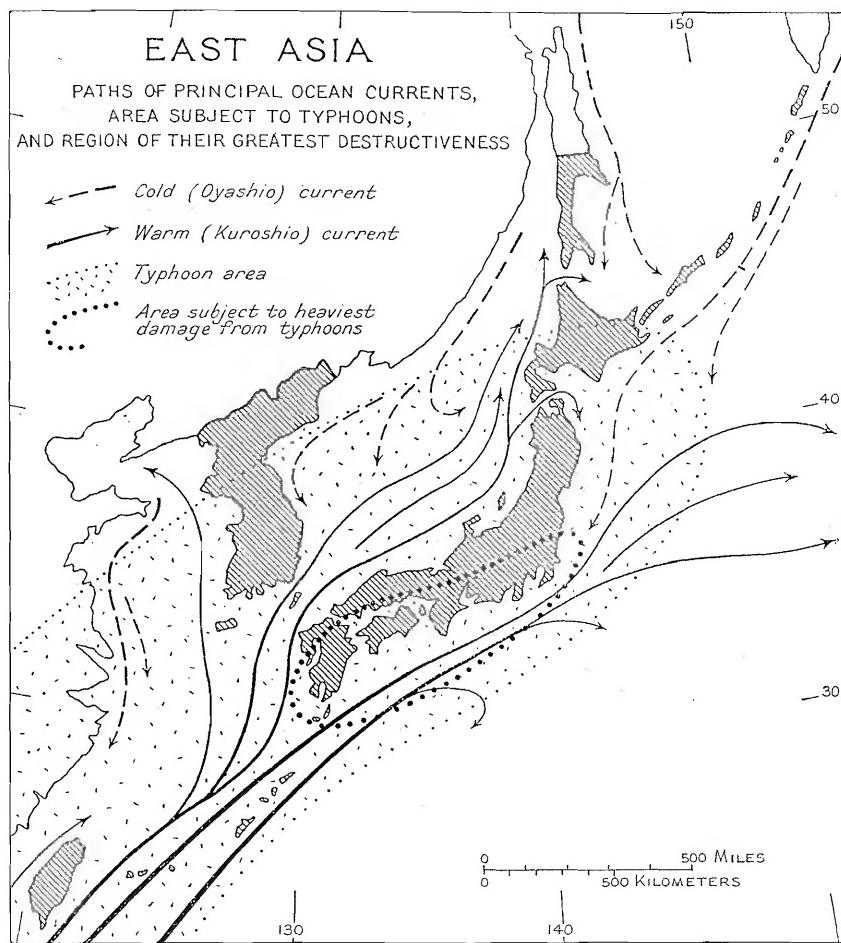


FIG. 1—Generalized from maps in Haushofer: Japan und die Japaner, p. 40; Little: The Far East, p. 302; Kishindo: Results of Oceanographical Studies . . . p. 237; and Wüst: Kuroshio und Golfstrom . . . opp. p. 70.

Typhoons, or cyclonic storms of tropical origin, strike the Pacific coast of southern Japan in September and October, bringing violent winds and heavy rainfall from Kyushu to Tokyo. Not infrequently the high winds, torrential rains, and great waves do considerable damage along the exposed coasts.

In so mountainous a country elevation and the nature of the relief is a major control, causing much diversity in local climatic conditions. The highlands trend in a direction counter to the general movement of the monsoon winds and the paths of the cyclonic storms. As the altitude increases, temperatures normally become lower, and the position of the mountains affects the amount and seasonality of rainfall.

THE CLIMATIC ELEMENTS

Differences in temperature between winter and summer, marked throughout Japan, are especially so in the north and in the more enclosed basins. In the interior of Hokkaido there is a range of 54.3° as compared to one of 34.9° in southern Kyushu (see Table IA). In atmospheric pressure, too, there is a seasonal contrast; it is higher in winter than in summer. Average pressure at Tokyo is 30.07 inches in November and 29.79 inches in June; at Osaka the extremes are 30.12 inches in January and 29.78 inches in June.¹ Relative humidity differs among the principal stations. At most of them the yearly average falls between 75 and 80 percent, although at some it is as low as 71.1 or as high as 86.1 percent. The humidity is nearly everywhere greater in summer, and sensible temperatures are high. People seek the cooler coastal and mountain resorts in the summer season.

Precipitation, varying with relief and exposure, is greatest on mountain slopes facing the sea, as at Kochi Observatory in southern Shikoku, which has a yearly average of 106.4 inches in contrast to the 44.0 inches at Matsumoto in the interior of Honshu (see Table IB). In most of Japan the rainy season occurs in the summer. The Japanese call the gentle, steady monsoon rains of this season the *bai-u*, or "plum," rains, for they set in with the ripening of the plums. The warm, moist air currents from the southeast, then at their height, are frequently disturbed by relatively weak cyclonic activity. Violent rains due to typhoons come in late summer and early autumn along the Pacific margin. Winter precipitation, often in the form of snow, is especially heavy in those parts which face the Sea of Japan.

THE CLIMATIC REGIONS

Because of the great regional diversity, the islands of Japan proper may be divided into eight climatic provinces.² The regional boundaries are shown on the accompanying map (see Plate I).

¹ Unless otherwise noted, data in this section are based upon the climatological tables in Okada: *The Climate of Japan*.

² The arrangement followed here is a modified form of that given in Fukui: *Climatic Division of Japan*, pp. 1-19, 109-127, 195-219, 271-300.

1. *Hokkaido.* The northern island of the group differs from the others in having longer and colder winters. The average temperature is below freezing for four months, except in the southwestern peninsula, where there are three such months. Temperatures are sometimes very low; on January 25, 1902, there was a recording of -41.8° F. The average frost-free season³ at Asahigawa, an interior station, lasts from May 27 to October 2. Summers are warm (see Table IA). Along the eastern coast, the proximity of the cold current lowers the temperature and causes dense fogs in June and July.

TABLE IA—JAPAN PROPER: MEAN TEMPERATURES AT EIGHT REPRESENTATIVE STATIONS

REGIONAL STATION*	TEMPERATURE			
	MEAN (ANNUAL)	MEAN A (WARMEST MONTH)	MEAN B (COOLEST MONTH)	RANGE A TO B
1. Asahigawa	41.5°F.	68.5°F. (Aug.)	14.2°F. (Jan.)	54.3°F.
2. Sendai†	51.8	74.8 (Aug.)	30.7 (Feb.)	44.1
3. Niigata	54.7	77.7 (Aug.)	34.7 (Jan.)	43.0
4. Matsumoto‡	50.5	73.0 (Aug.)	28.2 (Jan.)	44.8
5. Tokyo	56.8	77.7 (Aug.)	37.4 (Jan.)	40.3
6. Osaka	59.2	81.1 (Aug.)	39.9 (Jan.)	41.2
7. Shimonoseki	59.4	79.5 (Aug.)	41.5 (Feb.)	38.0
8. Kagoshima	61.9	79.9 (Aug.)	45.0 (Jan.)	34.9

* Unless otherwise noted, data are based upon observations covering the years 1897 through 1926.

† Observations cover the years 1927 through 1929.

‡ Observations cover the years 1898 through 1929.

The geographical position of each station is as follows: *Asahigawa*—371 ft. elevation, $43^{\circ}47'N.$, $142^{\circ}22'E.$; *Sendai*—131 ft., $38^{\circ}16'N.$, $140^{\circ}54'E.$; *Niigata*—27 ft., $37^{\circ}56'N.$, $139^{\circ}3'E.$; *Matsumoto*—1,910 ft., $36^{\circ}14'N.$, $137^{\circ}59'E.$; *Tokyo*—19 ft., $35^{\circ}41'N.$, $139^{\circ}46'E.$; *Osaka*—10 ft., $34^{\circ}39'N.$, $135^{\circ}26'E.$; *Shimonoseki*—158 ft., $33^{\circ}57'N.$, $130^{\circ}56'E.$; *Kagoshima*—18 ft., $31^{\circ}34'N.$, $130^{\circ}33'E.$.

Source: Okada: *op. cit.*, pp. 289, 355, 356. Temperatures converted from degrees centigrade. Elevations converted from meters.

Precipitation differs in the various parts of the island. In the eastern areas bordering the Pacific the peak occurs in September, and the yearly total is less than elsewhere in Hokkaido. The western areas exposed to the Sea of Japan have their season of heavy rain in the late autumn and early winter. Asahigawa has an average of 214 days with precipitation and only 12 clear days a year. There the peak comes in September. The snow season for the island as a whole lasts from about November 1 to April 1, and the cover is thick, especially on the western side.

2. *The Outer Zone of Northern Honshu.* The Pacific side of northern Honshu has less severe winters than Hokkaido, though January temperatures are below freezing. The cold current extends farther south in winter. Summers are cooler than on the Japan Sea; there is an average August temperature of 74.8° F. at Sendai in the southern part of this region in contrast to 77.7° F. at Niigata. The frost-free season usually lasts from May 6 to November 4.

³ The average duration of consecutive days free from hoar frost.

Precipitation is greatest in summer, there being a single maximum in September. In an average year, there are 154 days of precipitation at Sendai. Snowfall occurs throughout the region in the winter.

3. *The Inner Zone of Honshu.* Although winters are cloudy and unpleasant, temperatures are moderate. The January mean in the north is 29.5° F. (Akita), and in the south, 36.9° F. (Kanazawa). Niigata has a frost-free season from April 10 to November 20. Summer temperatures are warmer than on the eastern side of the island because of the proximity of

TABLE IB—JAPAN PROPER: MEAN RAINFALL AT EIGHT REPRESENTATIVE STATIONS

REGIONAL STATION	RAINFALL (in inches)		
	MEAN (ANNUAL)	MEAN (WETTEST MONTH)	MEAN (DRIEST MONTH)
1. Asahigawa	42.3	5.8 (Sept.)	2.0 (April)
2. Sendai	44.5	6.0 (April)	1.3 (Feb.)
3. Niigata	72.9	9.1 (Dec.)	3.7 (May.)
4. Matsumoto	44.0	6.9 (Sept.)	1.6 (Dec.)
5. Tokyo	64.0	10.1 (Sept.)	2.2 (Dec.)
6. Osaka	54.5	8.2 (June)	1.9 (Dec.)
7. Shimonoseki	66.6	11.7 (June)	2.7 (Nov.)
8. Kagoshima	88.3	17.1 (June)	3.4 (Jan.)

Data concerning stations of observation are given in note to Table IA opposite.

Source: Okada: *op. cit.*, pp. 327, 355, 356. Converted from millimeters.

the Tsushima Current. The highest temperature on record (102.4° F.) was caused by a foehn wind on August 6, 1909.

The side of Honshu toward the Japan Sea differs from the rest of the island in having especially heavy precipitation which reaches its peak during the relatively mild winter. The monsoon air masses of the Asiatic high-pressure center cross the warm current and are forced to rise over the mountain barrier. Snowfall in the central section reaches depths of 15 feet. The covered sidewalk (*gangi*) is an interesting local adaptation.

Wind velocities are higher than in other parts of Japan. Niigata Observatory records an annual mean of 11.5 feet per second and a January mean of 16.4 feet per second. Storms at sea and heavy snow on land sometimes disrupt transportation in the northern section during the winter. The severity of the season prevents much double cropping there and permits only a little in the south. Rice is the principal crop throughout the region; mulberry and other crops are cultivated in the south, also. The influence of the moderate temperature and abundant rainfall may be noted in the importance of fruit growing.

4. *The mountains and valleys of central Honshu.* The enclosed basins have greater continentality than the rest of Honshu. Temperatures high in summer and freezing in winter are common, but recordings are noticeably lower in the northern part. The usual frost-free season at Matsumoto lasts from May 14 to October 18.

Precipitation is less than in the bordering coastal areas: Matsumoto has a yearly mean of 44.0 inches. The primary maximum occurs in September and a secondary, in June. Winter

precipitation is light except for snow in the northern mountains. On clear nights in late summer and fall radiation causes land fogs in the valleys.

Differences in altitude produce considerable differences in vegetation; many mountains whose lower slopes are forested rise above the tree line. The basins are given over to the cultivation of rice and cereals with some double cropping. On the lower slopes, in certain places, mulberry is of paramount importance in the domestic economy.

5. *Southeastern Honshu.* The warm Kuroshio Current brings mild winters to the eastern shores of central Honshu. The average January temperature of Tokyo (37.4° F.) is higher than one would expect at a latitude of $35^{\circ}41'N$. Foehn winds add unseasonably warm days to the winter weather. The frost-free season lasts from April 9 to November 11.

High precipitation occurs mainly in summer. A preliminary maximum in June is followed by a peak in September and October when typhoons bring violent downpours. Some cyclonic precipitation, with an occasional snowfall of short duration, occurs during the winter.

Double cropping of the fields, including the drained paddies, where barley and wheat follow the rice, is common. The heavy rainfall characteristic of the seaward side of coastal mountains here permits the cultivation of tea and fruit (especially Mandarin oranges) on slopes and terraces along the southern coast.

6. *Inland Sea.* Though without direct exposure to the ocean, the lands bordering the Inland Sea have the benefit of some marine influence, but the region is sufficiently landlocked to have hot summers. The average August temperature at Osaka, 81.1° F., is higher than that of any of the other regional observatories. Land and sea breezes occur locally. In the eastern section the still summer evenings are unpleasantly hot. The frost-free season lasts from April 9 to November 15.

In comparison with other parts of southern maritime Japan, precipitation in this region, protected from direct monsoon winds, is light. Maxima are reached in June and September, the peak in the earlier month. Double cropping is the usual practice, and the evergreen forests on the hill slopes are well cared for. It is a green landscape, even in winter. Sunny days are frequent; light-colored clothing appears; and the houses are brightly decorated.

7. *Extreme Western Japan.* Marine influence upon the climate is more pronounced in northern Kyushu and the adjoining part of Honshu than in the region around the Inland Sea. Because of the proximity of the warm Tsushima current, January temperatures are mild, with a mean of 42.1° F. at Shimonoseki. August temperatures there average 79.5° F. The long frost-free season lasts from March 25 to December 2.

About a third of the heavy annual precipitation falls during June and July, and a secondary maximum is reached in September. The northern section, facing the Sea of Japan, receives more winter precipitation, including some snow.

8. *Outer Zone of Southwestern Japan.* The influence of the ocean is most strong along the southern shores of Kyushu, Shikoku, and southwestern Honshu—a single climatic region. Winter temperatures are the mildest in Japan proper. Kagoshima, not altogether typical because of its protected position at the head of a bay, has an average January temperature of 45.0° F. Summer temperatures are slightly lower than in the Inland Sea region to the north, but sensible temperatures are high because of heavy precipitation. Almost one-third of the rain comes in June and July. There are secondary maxima in September

and April. In association with a typhoon, on August 15, 1899, a record wind velocity of 162.7 feet per second was reported at Kagoshima. Although the region is favored climatically in being able to grow two crops of rice during the year, other geographical factors have kept it isolated and backward. Utilization of tropical and subtropical trees, such as camphor, palm, and bamboo, is important.

The climatic regions of Japan have here been drawn upon a large scale. They might well have been broken into many smaller sections, for actually, each valley and mountain-side has a distinctive climate.

FORESTS

NOTE: In this and the two following sections (Agriculture and Fishery Industries), the greater part of the data refer to the period specified in each case. The use of the present tense is not intended to imply that all these conditions still obtain.

Forests cover half Japan. They yield the domestic fuels (charcoal and wood), the common building materials (wood and thatch), industrial raw materials (pulp for synthetic fibre and for paper-making), medicine (camphor), and even food (nuts, fruit, mushrooms, and bamboo shoots). The quantities they yield in normal times are inadequate to the national requirements, however. This is partly because it has been considered important to check soil erosion, reduce floods, and maintain the supply of hydroelectric power for the populous lowlands by a program of forest conservation.

FOREST AREA (1933)

About three-fourths of the forests are in their natural state, though nearly half the stand is mainly scrub suitable only for fuel. The forest-covered area may be classified according to the predominant kind of tree.

TABLE II—JAPAN PROPER: FOREST AREA, 1933

TYPE OF FOREST	AREA IN SQ. MI.	PERCENT OF TOTAL
Coniferous forest	20,925	26
Broadleafed forest	35,073	44
Mixture of both	21,056	27
Bamboo forest	572	1
Miscellaneous	1,798	2
Total forests	79,424	100

Source: Nasu: Aspects of Japanese Agriculture, p. 58.¹

In the total forest area, there is sometimes included an additional category of uncultivated grassland (*genya*) which covers a little more than 12,000 square miles throughout the country.

FOREST ZONES

The influence of climate is reflected in the distribution of the principal species.

1. Northern and eastern Hokkaido lie in the *boreal forest zone* where

¹ The numerical data for this section taken from this book and from the *Far East Year Book 1941* are based upon the reports of the Bureau of Forestry.

fir and spruce are characteristic, with some intermixture of broadleaved deciduous trees. This area supplies both timber and pulpwood.

2. In the *temperate forest zone* which includes southwestern Hokkaido and all of Honshu above the latitude of Tokyo, the original broadleaved deciduous trees predominate, although there has been extensive planting of the commercially more valuable conifers. In the higher altitudes the conifers prevail, the principal types being cypress, cryptomeria, arbor vitae, cedar, and fir. Among the deciduous trees, beech, ash, chestnut, poplar, oak, and *kayaki* are of leading importance. The chief timber-producing areas of Japan lie within this zone.

3. In the *southern, or subtropical, forest zone* the original evergreen broad-leaved trees have been largely supplanted by broadleaved deciduous species. Oaks are now dominant; bamboo, camphor, and other types are common. Some pines and spruce are found in the northern part and in the higher altitudes of this zone. In southern Kyushu, palms and banana trees occur.

UTILIZATION OF FORESTS (1933 AND 1934)

Less than half of the forests are privately owned.² Some crown and state forests have been set aside as national parks, and temple and shrine forests also serve this purpose. Forests belonging to the state are distributed in important watersheds to prevent floods and control soil erosion. Those belonging to local communities are planted systematically under state supervision. The private forests are, in some instances, hereditary holdings of feudal origin and, in others, the property of large companies.

Approximately five percent of the gainfully occupied population are forest workers, but of these more than four-fifths in 1934 were also employed in some other occupation. Most were farmers who went into the forest during the slack season to cut timber and firewood and to make charcoal.

² TABLE III—JAPAN PROPER: AREA OF FORESTS, INCLUDING GENYA, BY OWNERSHIP, 1933

TYPE OF OWNERSHIP	AREA IN SQ. MI.	PERCENT OF TOTAL
Crown forests	5,597	6
State forests	29,557	32
Communal forests	16,549	18
Temple and shrine forests	555	1
Private forests	39,150	43
Total	91,408	100

Source: *The Far East Yearbook, 1941*, p. 306.

The remaining one-fifth were employed full time on afforestation projects or in commercial forests. Wages, although higher than those for farm labor, were low in comparison with industrial rates. In 1934 they ranged from 90 sen (about 27 cents) per day for men working on afforestation projects to 1.32 yen (about 40 cents) for woodcutters. Women working on afforestation projects received an average wage of 54 sen (about 16 cents).

Timber production accounted for 54 percent of the value of all forest products in 1934.³ The important conifer timbers are cryptomeria, pine, and fir; and the leading broadleafed timbers are oak, ash, and Paulownia, a soft wood used for furniture and shoes. While small-scale production is widely scattered, large-scale lumbering is carried on chiefly in northern Honshu, in Hokkaido, and in remote mountain areas in southern Japan.

The ambitious program of afforestation sponsored by the government was intended to improve the quality of the timber and to reduce dependence upon imports. By whatever means a remarkable change in the foreign trade was effected between 1936 and 1939. Imports of pine, fir, and cedar were reduced from 47.4 to 10.6 million cubic feet, and pulp for paper from 157.4 to 26.7 million tons. During the same period the quantities of rough or hewn wood, sawn wood, and plywood exported to foreign countries increased variously from two- to five-fold.⁴

³ TABLE IV—JAPAN PROPER: VALUE OF FOREST PRODUCTS, 1934

PRODUCT	VALUE IN THOUSAND YEN	PERCENT OF TOTAL
Timber: Coniferous	96,694	46
" Broadleafed	16,056	8
Total timber	112,750	54
Wood for charcoal & fuel	59,789	28
Bamboo	2,581	1
Miscellaneous*	35,269	17
Total forest products	210,389	100

* In the miscellaneous group there are included: seeds for afforestation, bark, fruit, bamboo sheaths, grass, mushrooms, etc.

Source: Nasu, *op. cit.*, p. 61.

⁴ U. S. Department of Commerce: *Foreign Commerce Yearbook 1939*, pp. 266, 267.

AGRICULTURE

In modern Japan agriculture still occupies more people than manufacturing, commerce, transportation, and communications combined. Its relative importance has shrunk, however. While the population has been expanding, farmers have remained almost constant in number. According to the census of 1920, the total of individuals engaged in agriculture was 14,300,000, or 52 percent of the gainfully occupied population; in 1936, their number was officially estimated at 14,100,000 which represented only 44 percent of the gainfully occupied population.¹ There were about 5,600,000 "agricultural families" in 1936; and 1,400,000 of them were also engaged in subsidiary occupations.² These families have produced most of the food consumed in Japan and one of the leading peace-time exports, raw silk.

GENERAL CHARACTERISTICS (1936)

An unusually small proportion of the land is suitable for agriculture in Japan. Approximately 16 percent of the total area is now cultivated, out of an estimated arable area of 20 percent. Most of the unused arable land is in Hokkaido. Reclamation there balances the loss in central and southern Japan, where expanding cities encroach upon the fields. The total cultivated area remains about 15,000,000 acres; but since fields are used twice and even three times, where climate and market factors allow, the yearly crop area is 18,000,000³ or 20,000,000 acres.⁴ Most of the double cropping is carried on in central and southern Japan. In the main islands as a whole, two-fifths of the rice and wheat are followed by winter crops; in the north green manure crops are grown in the winter, in the south barley and wheat, and in the extreme southern tip a second crop of rice. Near the cities of southern Japan intensive vegetable production yields as many as four crops a year.

The typical Japanese farm is small and very often a group of scattered plots. Although the mean size of the farms is 2.7 acres, 70 percent of them are smaller. One-third of the farmers use less than 1.225 acres (one-half cho); another third use between 1.225 acres and 2.45 acres (1 cho); and less

¹ Census data for 1920 from *Resumé Statistique de l'Empire du Japon, 1938*, p. 9, and *Nippon Rodo Nenkan 1937*, pp. 101-103; estimate for 1936 from *Oriental Economist Supplement—Japan in 1938*, p. 19, as quoted by Schumpeter: The Population of the Japanese Empire, p. 76.

² *Noji Tōkeihyo 1939*, as quoted in *Nogyo Nenkan 1941* and requoted by Grajdanzev: Statistics of Japanese Agriculture, p. 27.

³ Pelzer: Population and Land Utilization, p. 113.

⁴ *Nogyo Nenkan 1940/41*, as quoted by Grajdanzev; *op. cit.*, p. 15.

than one-tenth, more than 4.9 acres (2 cho). There has been little change in these proportions in recent years.⁵ The tiny plots of these farms are usually not contiguous, a great disadvantage because of time consumed in carrying implements and the harvest. The multiple fields owe their origin to the inheritance system, to the farmers' desire for diversity of crops, and to old-fashioned methods of irrigation.

Cultivation is intensive, and labor is not spared. In planting and harvesting, simple hand tools and extreme care are the rule. Horses or oxen, often owned communally, are used in heavy tilling. In 1936 there were 443,000 oxen and 1,432,000 horses, approximately one such animal to every three agricultural families.⁶ There is beginning to be some use of machines, such as simple threshers, of which joint ownership is frequent. Coöperative movements are widespread but strictly controlled by the government.

PRINCIPAL CROPS (1939)

The dominant crop is rice, to which about forty percent of the crop area is devoted (see Table V). Paddy rice has the highest yield among the grains, and the quality of this favorite cereal of the Japanese has been constantly improved with government aid. All over the country the best fields are in rice, and the seasons of its cultivation govern the farmer's life. The major costs are in labor. The rice seed must be planted in small beds, the young plants transferred to the paddy fields, constantly irrigated and tended during the growing season, and the grain finally harvested by hand.⁷ The cost of fertilizer is an important item, for artificial fertilizers are being increasingly used.

Cereal crops grown in dry fields, such as barley, wheat, and oats, are second in importance among the food crops. In northern Japan these are planted on hill slopes or diluvial terraces for the single summer crop. In southern Japan they are usually autumn-sown and remain dormant during the short winter; harvest in early summer permits a second crop. A small amount of rice is also grown on southern dry fields. Beans, millet, maize, buckwheat, sweet potatoes, and white potatoes are raised in certain areas. Garden vegetables are important near urban centers. Along the southern sea margins and in specialized zones, mandarin orange, persimmon, and pear orchards have been developed. Tea, popularly associated with Japanese agri-

⁵ *Nogyo Nenkan* 1940/41, as quoted by Grajdanzev; *op. cit.*, p. 31.

⁶ *Norinsho Tokeihyo*, 1939 and *Norinsho Tokeihyo*, 1936, as quoted by Grajdanzev; *op. cit.*, p. 26.

⁷ See Crocker: The Japanese Population Problem, pp. 221, 222.

culture, actually occupies a small portion of the alluvial terraces in Shizuoka and adjoining prefectures.

TABLE V—JAPAN PROPER: AGRICULTURAL PRODUCTION, 1939

COMMODITY	CROP AREA (in thousand acres)	TOTAL PRODUCTION (thous. bu.)	YIELD PER ACRE	CROP VALUE PER ACRE IN YEN
Rice, Total	7,822	342,061	43.73	367
Paddy Upland	7,450 372			
Other Principal Grains	4,001			
Barley	867	38,509	44.41	137
Naked Barley	1,004	33,386	33.26	147
Wheat	1,827	60,085	32.89	173
Oats	304	9,662	31.83	65
Beans, Potatoes, & Other Cereals	2,730			
Soya Beans	795	13,625	17.14	110
Small Beans	239	3,477	14.57	124
Millets: Awa	154	3,546	22.38	89
Mie	80	2,733	34.11	82
Kibi	45	865	19.29	80
Maize	130	3,269	25.08	104
Buckwheat	200	3,298	16.50	62
Sweet Potatoes	681	7,716*	11.34*	208
Irish Potatoes	406	4,152*	10.22*	215
Other Vegetables	1,440			271
Tea	99			471
Industrial Crops	754			318
Green Manure	1,153	11,297*	9.80*	23
Mulberries	1,307			637†
Other Crops	660			200
Total Crop Area	19,966			

*Production in thousand pounds and yield in pounds per acre.

†Value of cocoons.

Source: *Norinsho Tokeihyo* 1939, as quoted by Grajdanzev, *op. cit.*, pp. 18-23.

The mulberry is a small tree—practically a bush—grown in dry fields. Picking the leaves and feeding the silkworms requires much skill and

patience. The sale of cocoons to nearby filatures was for many years a major source of the agricultural family's cash income, but the demand for raw silk is largely dependent upon a favorable export market, and the trend has been downward since 1929, although prices were unusually high in 1939. From 1940 on, the government subsidized farmers converting mulberry fields into ones producing flax, hemp, or food crops or into sheep pastures.

In view of the limited area available for grazing, animal husbandry has advanced slowly, and its possible extension to uncultivated grasslands on mountain slopes is still under discussion. Production has been gradually increasing. In 1920, 164,341,440 pounds (19,872,000 kwan) of meat were produced, and in 1936, 297,984,640 pounds (36,032,000 kwan). The number of dairy cows doubled between 1922 and 1936, but there were only 105,063 cows in the country in the latter year. These produced 73,512,300 gallons (1,546,000 koku) of milk. Chickens to the number of 50,793,000 were reported for the year 1936, and for the year ending June 30, 1936, there was a yield of 3,537,000,000 eggs.⁸ By western standards, the per capita consumption of animal products is low in Japan.⁹

TENANCY (1939)

Practicing farmers in Japan may be grouped according to three chief types of property relation: 1) owners cultivating their land themselves (31 percent); 2) tenants renting all their land (27 percent); and 3) owners

⁸ Data for 1920 from *Nagoya Keizai Tokai Nempo 1936*; data for 1936 from the *Oriental Economist*, as quoted by Penrose: Japan . . . p. 185.

⁹ TABLE VI—JAPAN PROPER AND GREAT BRITAIN: CONSUMPTION PER HEAD OF POPULATION

FOOD	OUNCES CONSUMED PER WEEK IN 1934	
	JAPAN	BRITAIN
Rice	129.0	1.8
Wheat (as bread)	16.1	82.6
Meat and poultry	1.7	44.0
Fish	29.5	13.2
Eggs (number)	1.0	2.9
Milk (pint)	0.12	2.8
Butter and cheese	0.2	11.5
Sugar and honey	2.6	27.7
Tea	0.3	4.0
Fruit and vegetables (Pence at British Prices)	20.6	19.2

Source: Clark: *The Conditions of Economic Progress*, p. 119.

cultivating their own plus some rented land (43 percent).¹⁰ Probably a little less than half the paddy fields and three-fifths of the dry fields are owned by those who cultivate them; the rest are cultivated by tenants. Farm laborers, apart from seasonal and part-time workers, are comparatively few.

Competition for arable land is keen, and rents are exorbitant. The average rent is half of the farmer's gross yield; and from his share he must pay the farming expenses. In poor years he often falls into debt. Debt conditions are severe, and the possibility of clearing obligations is slight. There has been little change in the proportion of tenancy during the past few decades in spite of efforts to improve the condition.

Another serious problem for the farmer is fluctuation in the price of produce. The difficulty seems to be the basic one that, in his attempt to extract a constantly higher yield from the limited cultivable area, the Japanese farmer has long since passed the point of diminishing returns. His costs of production, especially of labor, have become so high that he cannot compete in a free international market.¹¹ The government's attempts to protect

¹⁰ TABLE VII—JAPAN PROPER: CLASSIFICATION OF AGRICULTURAL FAMILIES BY PROPERTY STATUS
(In thousands, rounded to the nearest hundred thousand)

CLASSIFICATION	1929	1931	1936	1939
Owners	1,700	17,00	1,700	1,700
Tenants	1,500	1,500	1,500	1,500
Part-owners	2,400	2,400	2,400	2,300
	5,600	5,600	5,600	5,500

Source: *Nogyo Nenkan* 1940/41, as quoted by Grajdanzev: *op. cit.*, p. 27.

¹¹ TABLE VIII—COMPARISON OF PRODUCTIVITY PER HEAD OF MALES OCCUPIED IN AGRICULTURE
IN CERTAIN AGRICULTURAL COUNTRIES

COUNTRY	MALES OCCUPIED PER 1000 HECTARES ARABLE & PASTURE	PRODUCTIVITY PER HEAD IN I.U.*
Australia	7	1524
New Zealand	20	2444
U.S.A.	25	661
Canada	35	618
U.S.S.R.	64	88
Great Britain	70	475
France	134	415
Germany	162	490
Belgium	388	394
Japan	868	120

* I. U.—International Unit. "An international unit is defined as the amount of goods and services which could be purchased for \$1.00 in the United States over the average of the decade 1925-1934."

Source: Clark: *op. cit.*, pp. 2, 246.

Japanese rice growers by tariffs and price-fixing could not prevent competition from colonial sources.¹²

The farmer must count on getting a share of his income, averaging, perhaps, thirty percent, from other sources than his food crops. Sericulture used to furnish much of this supplement. The rest must come from the sale of livestock, poultry, or aquatic products, and part-time employment on other farms, in forests, in fishing, or in industry. The low level of the average wage rates of farm laborers gives some indication of their standard of living.

TABLE IX—JAPAN PROPER: AVERAGE DAILY AGRICULTURAL WAGES IN 1929, 1936, AND 1939
(*In yen per day*)

ANNUAL AVERAGES	1929	1936	1939
Men employed by the year	0.66	0.50	0.83
Women " "	0.48	0.35	0.62
Men employed seasonally	1.45	1.00	1.89
Women " "	1.08	0.80	1.45
Men employed by the day	1.35	0.89	1.65
Women " "	1.03	0.67	1.29
Dollar value of yen, December	\$ 0.461	0.285	0.234

Sources: data as to wage rates from *Norinsho Tokeihyo 1939*, as quoted by Grajdanzev: *op. cit.*, p. 30; data as to exchange rates from League of Nations: *Statistical Yearbook 1937/38*, p. 231, and League of Nations: *Statistical Yearbook 1939/40*, p. 200.

AGRICULTURAL REGIONS

The considerable differences in farming practice and crops within Japan correspond in general to the climatic provinces (see p. 15). In the following modification of Nasu's classification,¹³ nine agricultural regions are recognized.

1. *Hokkaido* differs from the rest of Japan in that winter cropping is impossible, upland fields are more significant, and farmers are less dependent upon rice. The population is relatively sparse. Although there are possibilities for extending the frontier of cultivation, it is a pioneer zone with but limited potentialities.¹⁴

¹² The result has been a persistently large carryover. In 1936, domestic production of rice in Japan proper amounted to 57,457,000 koku (1 koku—5.1 bushels); the carryover from the preceding year, to 9,936,000 koku; and net imports from Formosa and Korea, to 13,255,000 koku. Of this a total of 72,-652,000 koku was domestically consumed, leaving a carryover for the next year of 8,006,000 koku.

See Penrose: *op. cit.*, p. 151.

¹³ Nasu: *op. cit.*, pp. 48-53.

¹⁴ See Jones: *Hokkaido* . . . pp. 16-30; also Davis: *Settlement in Hokkaido*, pp. 386-399.

2. *Northern Honshu* is a mountainous transition zone. Here, also, dry fields are important, and millet often takes the place of rice. The farms are relatively large, and animals frequently employed.

3. Cut off by mountains, the *littoral of the Japanese Sea* is given over to subsistence agriculture. Rice is of major importance, with winter cropping rare except in the extreme south. Population has been decreasing in recent decades.

4. In the basins of the mountainous interior of *central Honshu* isolation is also a factor. Agriculture is dominantly of the dry field type on the lower mountain slopes. The silk industry is relatively important.

5. The *Kwanto plain* around Tokyo is most intensively cultivated. Proximity to the urban market and the presence of alluvial terraces causes specialization in upland crops, especially cereals, potatoes, and vegetables.

6. Along the *border of the Pacific Ocean westward from Tokyo to the Inland Sea*, there is an area especially well suited to agriculture of the Japanese variety. The level basins along the coast are adapted to rice cultivation and can be easily drained for subsidiary crops of barley and wheat during the mild winter. Vegetables, fruit, tea, and mulberry are grown in special areas.

7. The *margins of the Inland Sea* are even more favored; mountains protect the area from excessive rainfall and winter snow, while the marine influence prevents extreme changes in temperature. Large industrial cities provide markets to which products can be readily transported by sea or canal. All the characteristic Japanese crops can be easily cultivated. In these two areas living conditions are most satisfying to the Japanese.

8. *Kyushu* is somewhat more isolated. Climatic differences between north and south lead to a greater production of rice in the north and of cereals and sweet potatoes on the upland fields of the volcanic southern part.

9. Along the *southern shores of Kyushu and Shikoku* rice can be planted twice a year. Because of isolation and the small amount of agricultural land, however, this region lacks importance.

FISHERY INDUSTRIES

The skillful fishermen of the Japanese Empire, favored by long, irregular coast lines and varied currents in adjacent waters, bring in a large share of the world's annual catch. Its value and the range of the fleets in recent prewar years are indicated in Table X.

FISHING OPERATIONS (1936)

Of the 650,000 full-time fishermen in Japan proper in 1936, 477,500 were their own masters, often co-owners of a small vessel. This was typically of five tons or under, manned by a crew of not more than three, and employed in coastal waters. Most of the small fishing boats still relied on sail, although gasoline motors had been installed in about one in eight in 1936. There were also 9,900 deep-sea fishing vessels; these were usually larger, equipped with power and specialized gear, and operated by a crew of about twelve. There were only 70 steam vessels of 100 tons or over in 1935-1936, although their number was growing. Details of the operation of floating salmon and crab canneries in northern waters, an ambitious and apparently successful venture, are obscure, except for the fact that the Nichniro Fishery Company is the largest single operator.¹

In the harvest of coastal fishing, the most valuable catches (i. e. valued at five million yen or more in 1935-1936) were sardines, sea bream, yellow-tail, cuttlefish, mackerel, prawns and shrimps, tuna, trout, and herring. In deep-sea fishing, those of similar value were bonito, tuna, sardines, flat fish, and sea bream. The variety of other types, however, is astonishing. Trawlers brought in no single catch worth five million yen; and aquiculture in shallow bays and inland waters produced only one such crop, an edible seaweed.²

THE PLACE OF FISH IN THE NATIONAL ECONOMY (1936)

Beside the fish eaten fresh, an important share was prepared by manufacturing for future domestic consumption or for export, in both edible and inedible forms (see Table XI).

The importance of fish in the Japanese economy is greater than the statistics would indicate. A total of 651,436 individuals, or 2 percent of the gainfully occupied population of Japan proper, were engaged in fishing as a

¹ *Far East Yearbook 1941*, pp. 320, 321; *Japan Yearbook 1940-1941*, p. 445.

² *Far East Yearbook 1941*, p. 317; *Japan Yearbook 1940-1941*, pp. 444-448.

full-time occupation in 1936.³ Seasonal fishermen and workers in aquiculture and fish-processing industries increase to 1,534,400 persons, or 4.7 percent of the occupied population, the number engaged in the fishery in-

TABLE X—THE JAPANESE EMPIRE: FISHING GROUNDS AND VALUE OF CATCH IN 1935-1936 AND IN 1938-1939, FOR THE YEARS ENDING MARCH 31

FISHING GROUND	VALUE OF CATCH IN MILLION YEN	
	1935-1936	1938-1939
A. Home waters and other grounds based in Japan proper	296	426
Coastwise, Japan proper	182	249
Deep sea offshore, Japan proper	74	111
Trawling, East China Sea and Yellow Sea	7	8
Aquiculture (inland waters and coastal bays), Japan proper	26	30
Pearl culture, Japan proper	2	2
Whaling, off Japan proper	3	4
Whaling, Antarctic waters	2	22
B. Northern waters worked by Japanese floating factories (value of salt or canned fish)	90	—
Soviet waters, Okhotsk Sea	49	44
Kamchatka and Bering Sea	19	31
Nichniro Fishing Company's floating canneries	22	Not reported
C. Colonial waters	95	121
Korea	66	87
Formosa	14	16
Karafuto	8	13
Kwantung	5	1
South Sea Mandated Islands	2	4

Data from the *Far East Yearbook 1941*, pp. 311-321. These figures should be interpreted only as a general indication of the order of magnitude. The limits of the "fishing year" are not stated, and the basis of valuation is not fully explained. Neither is it clear whether fish used by the processing industries, other than the floating canneries, is included in the value of the catch. Without such information, the divergence between these figures and those of the *Japan Yearbook 1940-1941*, pp. 442-455, cannot be accounted for.

dustry in 1936; if part-time workers are also included, 20 percent of the population obtained income from the industry.⁴

In Japan, fish very largely takes the place of meat in the diet (see Table VI). The fishing grounds may, therefore, be regarded as great pastures. If

³ *Oriental Economist*, quoted by Schumpeter: *The Population of the Japanese Empire*, p. 76.

⁴ *Far East Yearbook 1941*, p. 313.

one could prorate them in terms of arable land, the ratio of population density would be substantially modified (see p. 53).

TABLE XI—JAPAN PROPER: VALUE OF MANUFACTURES AND OF EXPORTS OF FISHERY PRODUCTS IN 1936 AND 1939 (*in million yen*)

CLASSIFICATION OF PRODUCT	1936		1939	
	MFG.	EXPORTS	MFG.	EXPORTS
Food	138	82	199	152
Isinglass	10	6	—	8
Fish oil and whale oil	9	10	13	6
Glue	1	—	1	4
Fertilizer	29	—	29	9

Food includes fresh, dried, and salted fish, shellfish, edible seaweed, and fish liver as well as tinned and bottled fish and shellfish.

Sources: data for food, isinglass, and oil from the *Far East Yearbook 1941*, pp. 316, 318, 421; data for fertilizer and glue from the *Japan Yearbook 1940-1941*, p. 442.

MINERAL AND POWER RESOURCES

In estimating the quality of Japanese mineral resources, let us first consider the endowment of Japan proper and the use made of it in a recent representative year before we take account of colonial and other supplementary sources. In so rapidly expanding an economy there is no stable period which may reasonably be said to represent normal consumption. The year 1936, however, is the last for which at all adequate statistics are available, the last full year of comparative peace with China, and the mid-point in the ten-year period of rearmament between the first aggression in Manchuria in 1931 and the attack on Pearl Harbor in 1941. For convenience' sake, we shall focus our study upon that year.

The manufacturing industries functioning in Japan proper in 1936 were of four kinds, each with its particular set of mineral requirements. There was, first, a heavy industry, rapidly expanding and turning out not only pig iron and steel ingots but highly finished iron and steel products—machinery, munitions, ships, planes, and the like; for this were required enormous supplies of iron ore, steam coal and coking coal, limestone, and sulphur, as well as substantial, though smaller, amounts of manganese, other ferro-alloys, and the lighter non-ferrous metals. There was, in the second place, a chemical industry, also expanding and furnishing a range of products such as fertilizer, explosives, dyes, paints, synthetic fibres, and plastics; for this the mineral needs included nitrates, potash, and phosphates in addition to fuel and machinery. In the third place, there was a general manufacturing industry, long established in the production of textiles and a wide variety of consumers' goods for the home and export market; this had an especial need of such mineral products as china clay, pottery materials, abrasives, mica, gold, silver, semi-precious stones, asbestos, and refractories. Finally, the civil engineering industry was then actively engaged in the construction of highways, tunnels, fortifications and industrial structures; for this it needed much sand, gravel, clay, stone, limestone, gypsum, and asphalt.

SOURCES OF ENERGY

The need of power, common to them all, was principally met by supplies of coal, petroleum, and hydro-electric power. Coal was still of prime importance, although its predominance had lessened. The changes in its relative position have been measured as follows:

Ignoring the insignificant imports and exports of coke as well as the rather limited use of natural gas, and converting fuel oil to terms of coal at the rate of 4 barrels as equivalent to 1 metric ton of coal and 1 installed horsepower in water power plants equivalent to 3 tons of coal per annum, there were apparently available for consumption in 1913 in terms of coal 19,113,000 tons, of which coal accounted for 94 percent and water power for the remainder, as little or no fuel oil was used in that year. . . . In 1925 there were available a total of 38,495,000 tons, of which coal accounted for 79 percent, fuel oil for 2 percent, and water power for 19 percent. In 1929 the respective figures were 76, 2, and 22 percent, while in 1932 the figures were 66, 3, and 31 percent.¹

We may carry on this comparison for the year 1936, when the energy available for consumption from these three sources was equivalent to 67,525,000 metric tons of coal: of this 68 percent was in the form of coal; 10 percent, of fuel oil; and 22 percent, of water power. The changed proportions of the last two items reflect a sharp increase in imports of oil, partly for storage, rather than any decrease in hydro-electric capacity, which was expanding, also, but less rapidly.

1. *Coal.* The "actual" and "probable" reserves of coal in Japan proper were estimated at 6,223 million metric tons by the Imperial Geological Survey in 1911 and those of the Japanese Empire, at 8,051 million metric tons,² a reserve fifth in size among the countries of the western Pacific.³

¹ Bradley and Smith: *Fuel and Power*. . . p. 14.

² Inouye: *Coal Resources* . . . pp. 291, 295. In 1932 the Mining Bureau of the Department of Commerce and Industry in Japan issued a new estimate of which so few details are given that it is impossible to tell whether it was based upon geological field work and, if so, what territory was studied. In the absence of supporting evidence from the Geological Survey, it may be assumed that there was none. The authors of the 1932 estimate have given a numerical valuation of 6,685 million metric tons to a third category of "possible" reserves, described as "imagined to be there and . . . the most uncertain of all," thus raising the total by an amount greater than the original estimate. "Actual" and "probable" reserves, corresponding to the categories of the 1911 report, are given as a combined sum of 10,006 million metric tons; whereas the 1911 estimate for Japan proper, with allowance for depletion in intervening years, would have been about 5,700 million metric tons in 1932. The Mining Bureau's grand total of all three categories of coal reserve in Japan proper is 16,691 million tons. See *Japan Yearbook 1940-1941*, p. 477.

³ TABLE XII—EAST ASIA AND INDIA: ESTIMATED COAL RESERVES IN 1911
(Million metric tons in round numbers)

COUNTRY	TOTAL RESERVES*
China, including Manchuria	996,795†
Siberia	173,879
Australia	165,542
Indo-China	20,002
Japanese Empire	8,051
New Zealand	3,386
Netherlands Indies	1,311
British Borneo	75
Philippine Islands	66
India	79,001

If Japan proper were to use its coal at the per capita rate prevailing in the United States in 1936, the reserves would be exhausted within thirty years, even with a stationary population. On the other hand, if the per capita rate of coal consumption prevailing in Japan in 1936 were maintained without increase and if no coal were imported, the reserves should last nearly two hundred years. The bulk of the demand came from heavy industry and the manufacture of synthetic gasoline and other by-products. For the most part, coal was used for heating in large buildings only, and hydroelectric power supplemented it to a considerable extent as a motive fuel in rail transportation and general industry.

In 1936 Japan was the first coal-producing country of the Far East. Between 1912 and 1920 the annual output had increased from 19,640,000 to 29,245,000 metric tons.⁴ Although a producers' cartel had restricted expansion in more recent years,⁵ a record output of 41,803,000 metric tons in 1936 was reported.⁶ In quality, Japanese coal is mediocre, the greater part being low bituminous or sub-bituminous. The Geological Survey estimated anthracite and natural coke at about 0.4 percent of the total reserves, and the Mining Bureau placed the proportion of those types at 4 percent. Much of the bituminous coal produces coke too porous for metallurgical use; other varieties produce a hard, but sulphurous, coke suitable only for copper-smelting. It was customary as recently as 1928 to mix hard coking coal imported from Kaiping with Japanese coal in the proportion of one part Chinese coal to four parts domestic.⁷ Changes in the technique of Japanese metallurgy may have already reduced, and may ultimately overcome, this handicap. Another serious drawback lies in the irregular occurrence of the

* The estimates include "actual" and "probable" reserves of anthracite, bituminous, sub-bituminous and brown coals and lignites which are either "(1) in seams of one foot or over to a depth of 4,000 feet," or "(2) in seams of two feet or over at depths between 4,000 and 6,000 feet."

† The most recent published estimate of the Geological Survey of China gives as the total probable reserve 243,669 million metric tons. See Hou: *General Statement...* No. 5, Table I. The figure above is that of Professor Drake, the higher of the two alternatives presented in 1911.

Source: International Geological Congress: Coal Resources... Vol. I, pp. xx, xxii.

⁴ Japan, Department of Finance: *Financial and Economic Annual 1921*, p. 62.

⁵ For a description of its organization and operations, see Furuta: *Coal Demand...* pp. 279-285.

⁶ *Japan Yearbook 1940-1941*, p. 467. Apparently 3,748,000 tons of this total represented coke produced in Japan. The analysis made by the Imperial Institute (Great Britain) in its *Statistical Summary... 1936-1938*, p. 117, indicates a production in 1936 of only 38,075,000 metric tons (37,575,000 long tons) of semi-anthracite and bituminous coal in Japan proper with coke unreported. The Geological Survey of China estimated the production of coke in Japan proper in 1934 at 2,900,000 metric tons, (see its *Special Report No. 5*, Table 59). An output of 3,738,000 metric tons of coke two years later would be consistent with this estimate and with the Imperial Institute's report.

⁷ Orchard: *Japan's Economic Position*, p. 286.

coal seams, often in positions difficult of access, as a result of the complicated faulting in the geological structure of the islands.

Among the producing centers of Japan proper, the chief in 1936 was the coal region of northwestern Kyushu from which more than two-thirds of the domestic product came.⁸ Part of this was consumed in Kyushu by the metallurgical plants of the Yahata group; part was shipped from the ports of Moiji and Wakamatsu to the Kobe-Osaka industrial center (300 miles by water) and to other points along the coast.⁹ The concentration of population in southern Japan has favored the development of mining in Kyushu and extreme southwestern Honshu rather than in Hokkaido where there is bituminous coal of comparable quality (see Fig. 2).

Hokkaido contributed slightly more than one-fifth of the coal produced in Japan proper in 1936, most of it being shipped by rail and water to the Tokyo-Yokohama industrial area (600 miles). The largest single reserve in Japan, the Ishikari field, lies in west-central Hokkaido, and there are scattered small fields in the east. Hokkaido coal was markedly cheaper than Kyushu

⁸ TABLE XIII—JAPANESE EMPIRE: COAL RESERVES BY PRINCIPAL REGIONS IN 1911 AND PRODUCTION IN 1936 (*Million metric tons*)

REGION	RESERVES			PRODUCTION
	ACTUAL	PROBABLE	TOTAL	
Kyushu	542	2,374	2,916	29.6
Hokkaido	336	2,339	2,675	9.3
Shikoku	—	—	—	—
Honshu	70	512	582	2.9
Total Japan proper	948	5,225	6,173	41.8
Karafuto	18	1,345	1,363	2.1
Formosa	—	385	385	1.7
Korea	14	68	82	2.3
Total Japanese Empire	980	7,023	8,003	47.9

Sources: Data for reserves from International Geological Congress: Coal Resources . . . Vol. I, pp. 289-295; data for production, except of Karafuto, from Penrose: Japan . . . p. 265; data for production of Karafuto from Imperial Institute: *Statistical Summary . . . 1936-1938*, p. 85.

⁹ The actual water transport was cheap in normal times: the freight rate per metric ton of coal from Wakamatsu to Yokohama (600 miles) ranged between 1.00 yen and 2.10 yen (31 cents to 65 cents) in 1936. However, railroad charges at each end of the sea journey and the expense of loading and unloading the cargoes at the ports made the total shipping cost a considerable item. Complete recent data are lacking, but in 1922, when the sea freight rate for shipping a ton of coal from Wakamatsu to Yokohama was 1.90 yen, the supplementary shipping charges increased the total cost of transportation from the Kyushu mine to Tokyo to 8.70 yen per ton. See Uyehara: Industry and Trade . . . p. 200; *Oriental Economist*, December 1936, p. 797.

coal.¹⁰ The Joban field, fronting upon the Pacific Ocean about 120 miles north and slightly east of Tokyo, produced a coal of inferior quality used in the industrial districts of eastern Japan. The Ube field in southern Niigata

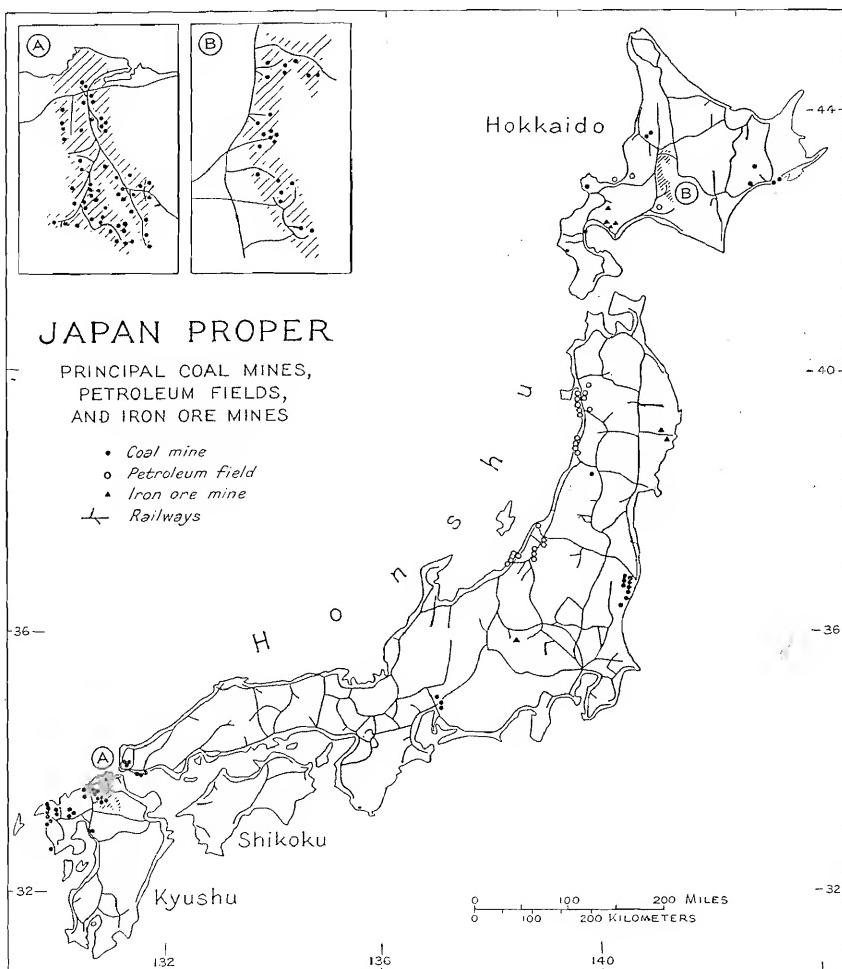


FIG. 2—The symbols appearing on this map correspond to those on a map entitled "Important Mines 1935" published by the Japanese Bureau of Mines in its *The Mining Industry in 1935*. These indicate the principal producing areas but do not represent exactly the chief producing mines and wells of 1935. Comparison of the names of the mines on the published map with those listed in the statistics of production in the same volume shows considerable discrepancies. Some of the large producers in 1935 are not on the map, and some of those shown there produced insignificant amounts in that year. The effect is to underestimate the importance of coal and to exaggerate that of petroleum.

and the Onada field in Honshu on the Inland Sea were of minor importance.

¹⁰ Mitsubishi Economic Research Bureau: Japanese Trade... p. 208.

The coal reserves in the outer Empire were estimated in 1911 to include 82 million metric tons in Korea, 385 million metric tons in Formosa, and 1,363 million metric tons in Karafuto. The estimate of reserves made in 1932 assigned 1,100 million metric tons to Korea, 400 million metric tons to Formosa, and 1,500 million metric tons to Karafuto. In 1936 Korean production supplied only about half that country's own requirements, although anthracite was sent to Japan.¹¹ Formosan production was rather more than sufficient for local use. The 638,000 metric tons of coal from Korea and the 114,000 tons from Formosa constituted 15 percent of the imports of Japan proper reported in 1936.¹² In Karafuto, 2,075,000 metric tons were produced in that year, but there is no indication of its destination. If half went to Japan, the sum of coal imports would have been increased by one-fifth.¹³

More substantial amounts were drawn from Japanese-controlled Manchuria, which in 1936 supplied 2,273,000 metric tons or 46 percent of the coal imported, the Fushun colliery being the principal source. From China there came 1,034,000 metric tons, or 21 percent of the imports, coking coal from Kaiping being the most important of this group. French Indo-China sent 883,000 metric tons, or 15 percent of the imports, chiefly anthracite from the Hongay mine.¹⁴

It will be seen that imports, except from the colonies and controlled territory, were small. Japan proper could have been easily self-sufficient in coal were it not for the metallurgical industry. In fact, more than ninety percent of the apparent consumption was supplied by domestic production in 1936. The price of Japanese coal was high, however. In 1936, the market quotation for a long ton of bituminous coal f.o.b. the Miike mine was 17.00 yen (\$4.84 in then current U. S. dollars) while in the same year the average spot price of bituminous coal in the United States was \$1.99 per net ton f.o.b. the mine.¹⁵

2. *Petroleum.* The reserves of the Japanese Empire are meagre in relation to the demand for petroleum products. Those of fields producing in 1924 were then estimated at 56 million barrels and the probable maximum, at 500 million barrels.¹⁶ Between that time and 1936 slightly more than

¹¹ Imperial Institute: *op. cit.*, pp. 85, 102, 117.

¹² Penrose: *op. cit.*, p. 265.

¹³ Imperial Institute: *op. cit.*, pp. 85, 117, 101, 102.

¹⁴ Penrose: *op. cit.*, p. 266.

¹⁵ *Oriental Economist*, December 1936, p. 788; U. S. Bureau of Mines: *Minerals Yearbook 1937*, p. 794.

¹⁶ W. B. Heroy, quoting A. H. Redfield in Bain: *op. cit.*, p. 120. See also Bradley and Smith: *op. cit.*, p. 10.

15 million barrels were extracted and no extensive new sources were found. As seven-eighths of the production then came from Japan proper, it may be calculated that the probable per capita reserve there in 1936 was 7 million barrels, which may be compared to the estimated per capita reserve of 140 million barrels in the United States in 1940.¹⁷ In the Far East, the Netherlands Indies, British Borneo, and possibly Siberia have far richer resources than Japan.

The domestic fields supplied Japan with approximately nine percent of the non-governmental requirements of crude oil in 1936. Among neighboring countries, more was produced in the Netherlands Indies (49.4 million barrels), British Borneo (4.7 million barrels), India and Burma (9.6 million barrels), and nearly as much in Sakhalin (2.2 million barrels).¹⁸ The production in Japan proper amounted to 2,403,000 barrels and that in Formosa to 42,000 barrels. This represented a very small advance over the previous record in Japan proper (1,923,000 barrels in 1930), and the output of the leading wells, with few exceptions, had declined consistently between 1931 and 1935, the latest year for which details are available. These facts suggest that the reserves may have been smaller than estimated and that the large fields were already approaching exhaustion. When compared to the United States' per capita production of 8.58 barrels in 1936,¹⁹ the Japanese production of 0.03 barrels per capita seems tiny; on the basis of the reserves indicated above, it implies a rate of exploitation about one-twelfth that of the United States.

The three principal producing areas in Japan proper in 1936—the Hokkaido, Akita, and Echigo fields—lie along a belt of Tertiary formations roughly parallel to the shore of the Japan Sea (see Fig. 2). Although the commercial production of crude oil was the virtual monopoly of the Nippon Petroleum Company, 1,347 separate concessions were registered on January 1, 1935.²⁰ The Shikko field in northern Formosa was the most important colonial source.

The domestic refining industry, protected by tariffs and subsidized by the government, had been steadily expanding in recent years. In 1935, it produced 49 percent of the apparent consumption of motor oil in Japan proper, 53 percent of the kerosene, and 110 percent of the lubricating oil,

¹⁷ The proved oil reserves of the United States as of January 1, 1940, are estimated by the American Petroleum Institute at 18,483 million barrels. See U. S. Bureau of Mines: *Minerals Yearbook 1940*, p. 948.

¹⁸ U. S. Bureau of Mines: *Minerals Yearbook 1937*, p. 1048.

¹⁹ *Ibid.* p. 1048.

²⁰ *Far East Yearbook 1941*, p. 354.

of which the surplus was exported.²¹ In 1936 a smaller proportion than in the preceding year was produced by domestic refineries, but there was an absolute increase of about one-sixth in their output.²²

The production of synthetic gasoline by the liquefaction of coal has also been actively promoted by the government, especially since 1937. A number of plants have been constructed in Japan proper, Korea, and Manchuria. The price of synthetic gasoline was well above that of the natural product in 1937 (0.80 yen per gallon vs. 0.64 yen per gallon), a discrepancy which it was proposed to meet by raising the price of natural gasoline through direct taxation and increased customs tariffs and by subsidizing the synthetic producers.²³ German and American authorities have expressed the opinion that the output of synthetic gasoline in the Japanese Empire at the end of 1940 was at the rate of 6 million barrels a year.²⁴

In 1936 Japan proper imported on private account 4,168,000 metric tons of petroleum and allied products, of which the most important component was 25,789,000 barrels of crude oil. Korea and Formosa were also net importers of crude oil and other petroleum products. So, too, was Manchuria, although shale oil from Fushun, amounting to 695,600 barrels, was supplied largely in the form of bunker fuel to ships of the Japanese navy.²⁵

Northern Sakhalin furnished 2,218,000 barrels in 1936,²⁶ however, it appears that since 1938 no oil has reached Japan from the Japanese concession there.²⁷ Much the largest share of petroleum imports in 1936 came from the United States. Of the crude and heavy oil imported by the Japanese Empire that year, the United States supplied three-quarters, the Netherlands Indies, one-eighth, and British Borneo, one-twelfth.²⁸

Petroleum products exported from Japan in 1936 went chiefly to Kwantung, Manchuria, and China proper and consisted of fairly small shipments of gasoline (114,000 barrels), some kerosene (19,193,000 barrels), lubricating

²¹ Computed from data in Imperial Institute: *Statistical Summary . . . 1933-1935*, pp. 268-315.

²² *Japan Yearbook 1940-1941*, p. 479.

²³ *Far East Yearbook 1941*, p. 358.

²⁴ Frechtling: Japan's Oil Supplies, p. 200.

²⁵ Imperial Institute: *Statistical Summary . . . 1936-1938*, pp. 298, 299, 323, and 324, and Fong: Post-war Industrialization . . . p. 4.

²⁶ U. S. Bureau of Mines: *Minerals Yearbook 1937*, p. 1048.

²⁷ See statement to this effect in Royal Institute of International Affairs: *Information Department Paper*, No. 18a, p. 43. In place of production figures for the years 1938 through 1940, the *Wirtschaft und Statistik* in April 1941 published data as to the proposed amounts of the Japanese subsidy and the quotas of crude oil which it was planned to produce. See *Ibid.*, p. 141.

²⁸ U. S. Bureau of Mines: *Foreign Minerals Quarterly*, April 1938, p. 46.

oils (13,627,000 barrels), petroleum jelly, pitch, and asphalt.²⁹ These represented a notable increase over 1935 in exports of kerosene and lubricating oil, and the volume of exports in 1938 revealed, as compared with those of 1936, a twelve-fold increase in shipments of motor oil, better than a two-fold increase in those of lubricating oil, and a decrease of about one-sixth in shipments of kerosene.

3. *Hydro-electric Power.* The steep mountains and moist climate serve Japan well with water power. The country has an estimated potential capacity of 14,500,000 horse power available in its streams for at least six months in every normal year. That which can be depended upon for twelve months in the year has been reckoned at 6,415,000 horse power.³⁰ On the six months' basis, the United States has an estimated potential of 57,180,000 horse power, or .443 horse power per capita as of 1936, in comparison with a per capita potential of .204 horse power in Japan. In the latter country, however, the water resources were being more rapidly developed. Nearly half the six-months' minimum potential was utilized in 1935³¹ as against the use of less than one third of the comparable potential in the United States. Among the countries of the western Pacific Japan is the leader in potential resources³² and in the thirties was the only producer of significance among them.

The output of electricity in Japan in 1937 was 26,570 million kilowatt hours (359 kilowatt hours per capita) of which 80 percent was generated from water power.³³ In the United States in the same year 168,300 million kilowatt hours (1,312 kilowatt hours per capita) was available to consumers, and of the output actually generated within the national borders 37.8 percent came from water power.³⁴ In Japan electric power was consumed principally in general industry, already highly electrified, in urban transportation, and in domestic lighting. The preference for hydro-electric power as against steam-generated electricity in some industrial districts had grown

²⁹ Imperial Institute: *Statistical Summary... 1936-1938*, pp. 268-315. Converted from long tons.

³⁰ Mitsubishi Economic Research Bureau: *op. cit.*, p. 219. According to definitions of gross capacity adopted by the World Power Conference for use in compiling their *Statistical Yearbook*, the potential energy available six months in the year was given by the Japanese Committee as 13,221,000 horse power in 1935. World Power Conference: *Statistical Yearbook*, No. 3, p. 110.

³¹ U. S. Bureau of the Census: *Statistical Abstract... 1941*, p. 446.

³² According to the estimate of the potential power resources of the world made by the World Power Conference in 1929, the potential horse power per square kilometer is as follows: Japan 11.81; Siam and Malaya 6.15; French Indo-China 5.71; India 5.50; Korea 2.27; China 1.76; Siberia 0.74; and Australasia 1.44. World Power Conference: *Power Resources... p. 41*.

³³ Penrose: *op. cit.*, p. 240.

³⁴ U. S. Bureau of the Census: *Statistical Abstract... 1941*, pp. 440, 441.

up rather accidentally. In the Osaka-Kobe district where industrialization had made headway before the general use of hydro-electric power, steam coal was still the major source of energy. In the Tokyo-Yokohama district, more recently industrialized and adjacent to the generating centers of the central and eastern Honshu highlands, hydro-electric power predominated. The local industries of the mountain valleys relied almost entirely upon hydro-electric power.

Irregularity in the amount of rainfall during the year and occasional severe droughts interfere with the steady output of energy from the streams. Auxiliary steam plants are frequently necessary. In 1936 the electric power industry used 3,174,000 metric tons of coal, or 6.7 percent of the total apparent consumption of coal in that year.³⁵

The principal producing districts are in central and eastern Honshu. As the streams are relatively short and swift, decentralization of producing units has been a feature of the Japanese system from the beginning. For example, in 1937 there were 52 generating stations along the Fuji River, 90 stations along the Shinano, and 80 stations along the Kiso.³⁶ Other important power rivers include the Tone, Sagami, Tenryu, Yodo, Agano, and Kurobe.

The government has played a leading part in the development of the industry. According to Japanese law, the stream beds and, therefore, all water power sites are the property of the government and may only be leased for development.³⁷ In 1932 the government selected a leading producer in each consuming area to handle the business there,³⁸ and in 1939 it took control of the system of generation and transmission, leaving some phases of distribution to private enterprise.³⁹

Electric power was cheap in Japan. For industrial users in 1935 the charge was 2 sen (less than 0.6 cents) per kilowatt hour,⁴⁰ or about one-seventh the average industrial rate in the United States in that year.⁴¹

To sum up the position in 1936 with respect to the sources of energy, Japan proper led the countries of the Far East in producing and consuming coal and hydro-electric power and in refining and consuming petroleum.

³⁵ Obama: *Our Electric Industry*, p. 585.

³⁶ *Far East Yearbook 1941*, p. 384.

³⁷ Orchard: *op. cit.*, p. 265.

³⁸ Mitsubishi Economic Research Bureau: *op. cit.*, p. 219.

³⁹ Obama: *op. cit.*, p. 582; *Japan Yearbook 1940-1941*, pp. 520-522.

⁴⁰ Mitsubishi Economic Research Bureau: *op. cit.*, p. 345.

⁴¹ U. S. Federal Power Commission: *Annual Report 1940*, p. 85.

If the potentiality of the combined resources of coal, petroleum, and water power be considered, Japan is not of the first rank in the Far East, being surpassed by China and India, and probably also by Siberia and Australia.

THE PRIMARY MINERAL MATERIALS OF INDUSTRY

The iron ore reserves of Japan proper were estimated at 56 million metric tons of magnetite and hematite by the Imperial Geological Survey in 1911 and those of Korea, at 4 million tons.⁴² Later estimates in 1921⁴³ and 1926 set the total probable reserve of such ores in the Japanese Empire at

⁴² Inouye: Iron Ore Supply. . . p. 933.

⁴³ TABLE XIV—EAST ASIA AND INDIA: ESTIMATED ACTUAL AND POTENTIAL IRON ORE RESERVES IN 1921
(Million metric tons in round numbers)

COUNTRY	TOTAL RESERVES	ESTIMATED IRON CONTENT
China, including Manchuria ^a	952	39 percent
Netherlands Indies ^b	800*	50 percent
Australia ^c	281	50-65 percent
Philippine Islands ^d	200*	53 percent
Japanese Empire ^e	85	50-60 percent
New Zealand ^f	64	40-60 percent
British Borneo and Malay Peninsula ^g	25	56 percent
Siberia, including Sakhalin ^h	5	35-65 percent
Indo-China ⁱ	"Moderate"	
Thailand ^j	"	
India ^k	2,000	60 percent

* Chiefly lateritic.

^a Tegengren: *op. cit.*, p. 293. An alternative estimate is given by Dr. Hou in the Chinese Geological Survey's *General Statement on the Mining Industry*, No. 5, Table 77, where the total is placed at 1,206 million tons.

^b Tegengren: *op. cit.*, pp. 414, 431. Alternative estimate by H. A. Brouwer, placing the total reserve at 1,050 million tons, is cited in Bain: *op. cit.*, pp. 114, 115.

^c Tegengren: *op. cit.*, pp. 419, 420. Alternative estimate by O. R. Kuhn lists 920 million tons of actual reserves and 42 million tons of probable reserves with estimated iron content ranging from 20 to 70 percent. See Kuhn: World's Iron Ore . . . p. 93.

^d Tegengren: *op. cit.*, p. 431.

^e *Ibid.*, pp. 408, 409.

^f *Ibid.*, pp. 420, 421.

^g C. K. Leith: The World's Iron Ore Supply. . . pp. 14, 15, as quoted in Bain: *op. cit.*, p. 116.

^h Tegengren: *op. cit.*, p. 406. Alternative estimate by O. R. Kuhn for Siberia, apparently excluding Sakhalin, gives the actual reserves as 33 million tons with estimated iron content from 35 to 65 percent. See Kuhn: *op. cit.*, p. 92.

ⁱ Tegengren: *op. cit.*, p. 431.

^j *Ibid.*, p. 416, and Bain: *op. cit.*, p. 116. Alternative estimate by O. R. Kuhn ascribes actual reserves of 3,326 million tons and possible reserves of 20,500 million tons with iron content varying between 50 and 68 percent. See Kuhn: *op. cit.*, p. 92.

85 million metric tons.⁴⁴ According to the most generous of these estimates, the utilizable reserves of Japan proper in 1936, after allowance for depletion, would have barely exceeded the production of a single good year in the United States.⁴⁵ Among the countries of the western Pacific, Japan ranks fifth as to iron ore reserves, and Indian reserves surpass all others.

The consumption of iron ore in Japan in 1936 was the largest in the Far East. The production of mines in Japan proper, however, made up only thirteen percent of the ore smelted. The domestic output, quadrupled between 1926 and 1936, was still less than that of Manchuria, Australia, the Unfederated Malay States, and China proper and just exceeded that of Korea or the Philippines.⁴⁶

There are a number of small iron-bearing deposits in Japan proper but less than a dozen of commercial importance (see Fig. 2). In the Kamaishi mining area of the Kitakami highland, magnetite deposits of the contact metamorphic type occur irregularly.⁴⁷ The Kutchan mine near Muroran, Hokkaido, produces limonite of high quality. Bog iron is mined in Hokkaido at the Abuta mine. Although there have been many attempts to utilize the

⁴⁴ Kuhn: *op. cit.*, p. 91; Ehlers: Raw Materials . . . p. 20.

⁴⁵ The total production of iron ore in the United States in 1940 was 74,865,700 metric tons. See U. S. Bureau of the Census: *Statistical Abstract of the United States, 1941*, p. 810.

⁴⁶ TABLE XV—EAST ASIA AND INDIA: PRODUCTION OF IRON ORE, PIG IRON, AND STEEL IN 1936
(*Thousand metric tons in round numbers*)

COUNTRY	PRODUCTION		
	IRON ORE (<i>metal content</i>)	PIG IRON	STEEL
Manchuria	1,300*	647	344
Australia	1,267	796	834
Unfederated Malay States	1,077	—	—
China proper	530†	—	—
Japan	470*	2,072	5,223
Korea	350*	217	87
Philippine Islands	310	—	—
India	1,666	1,568	880

* These should be interpreted as an indication of relative size rather than as exact tonnages. Varying opinions of the probable iron content of ores lead to considerable differences in foreign estimates of iron recovered, and no information on the subject is given by Japanese official sources.

† Exports only. Dr. Hou estimated the iron ore production of the principal mines in China proper in 1934 at 950,000 metric tons and that of the native mines at 409,582 metric tons. See China: Geological Survey: *General Statement . . . No. 5*, Tables 77 and 78.

Source: League of Nations: *Statistical Yearbook 1939-1940*, pp. 143-145.

† For description see Inouye: *op. cit.*, pp. 933-965, and Japan, Imperial Geological Survey: *Geology . . . p. 89.*

iron sands of northern Honshu commercially, the last reports were still little more than hopeful predictions.

In 1936 there were imported 4,023,000 metric tons of iron ore (sufficient to make about two million tons of pig iron), 1,095,000 tons of pig iron, and 1,497,000 tons of iron and steel scrap. Within the Empire, iron was secured chiefly from Korea, where 243,000 tons of ore and 123,000 tons of pig iron were shipped to Japan in 1936, or 6 and 11 percent, respectively, of total imports of ore and of pig iron. In Manchuria there is a reserve of iron ore variously estimated at 744 million tons (Tegengren) and 883 million tons (Hou). For the most part these ores are too low in iron content to merit direct shipment to Japan, but in the form of pig iron 271,000 tons, or 26 percent of total pig iron imports, were sent. The rest of Japanese iron imports came from countries in or near the Pacific area. Ore was drawn from Malaya, China, the Philippines, and Australia; pig iron, from India and Siberia; and scrap iron, from the United States, India, the Netherlands Indies, and Australia.⁴⁸

To insure a supply of such imports, Japanese enterprise had been active for some time before 1936 in securing financial control of mines, blast furnaces, and shipping facilities in China, Malaya, the Philippines, and Australia.⁴⁹ The development under Japanese auspices of ore mines in Johore and the Philippines apparently proceeded without serious hindrance. On the other hand, boycotts and obstruction provided formidable obstacles in China, and an eleventh hour reversal of Australian policy prevented Japanese mining companies from putting into use the equipment they had erected in the Yampi Sound area. The desire to consolidate and extend such holdings was doubtless an important motive in later aggression.

In view of Japanese dependence upon foreign supplies of iron materials, the tariff established in 1934 admitted iron ore and scrap iron free and placed a fixed duty upon pig iron of .36 yen per kin (about 10 cents per 132 pounds), which in 1935 and 1936 amounted to 10 or 11 percent of the market price, as against *ad valorem* duties of from 18 to 25 percent on iron and steel manufactures.⁵⁰ Prices reached fairly high levels, however. In 1939 the average price of iron ore in Japan was reported to be 20 yen (\$5.00) per metric ton and that of scrap iron, 80 yen (\$20.00).⁵¹ In the same year

⁴⁸ Penrose: *op. cit.*, pp. 256, 257.

⁴⁹ For details see *China Yearbook 1931-1932*, p. 182, and U. S. Bureau of Mines: *Foreign Minerals Quarterly*, April 1938, p. 42, and October, 1941, pp. 15-18.

⁵⁰ Japan, Department of Finance: *The Import Tariff of Japan, 1934*, pp. 95, 96, 99.

⁵¹ *Far East Yearbook 1941*, p. 340.

the average price of iron ore in the United States was \$2.89 per long ton, and that of scrap iron for export, \$15.40 per long ton.⁵²

As to other minerals for heavy industry, the Japan of 1936 was self-sufficient in sulphur and limestone and semi-sufficient in manganese, chromium, and copper.⁵³ In addition, tungsten, molybdenum, alunite, and some magnesite could be easily imported from the colonies, and ample magnesite, from Manchuria. Japanese industry was dependent upon foreign countries for practically all its nickel, vanadium, bauxite, and platinum, and for the greater part of its tin, mercury, lead, zinc, and antimony. Among the non-metallic minerals, fluorspar and graphite were supplied by Korea. There were few mineral raw materials to ship in exchange; in 1936 only sulphur and steam coal were exported in any quantity in unprocessed form.⁵⁴

For provisioning the chemical industry, there was a supply of synthetic nitrates and a small amount of phosphate rock from domestic sources. From the mandated islands in the South Seas came a further supply of phosphate rock, but the rest of the nitrate, phosphate, and potash minerals had to come from abroad.

For the general industry, there were produced at home adequate amounts of china clay, pottery materials, abrasives, mica, gold, silver, and semi-precious stones; but except for imports there would have been little or no crude asbestos or refractories. Of the latter, Korea supplied some graphite, and Manchuria, magnesite.

In the building industry almost alone Japan was provided with an abundance of the elementary materials—sand, gravel, clay, stone, and limestone, although gypsum and asphalt were insufficient, and other industries competed for the limited supply of fuel.

In the years subsequent to 1936, there have been numerous substitutions of mineral materials in Japanese industry. The nature and extent of many of these are largely conjectural, but it is known, for instance, that alunite, available in Korea, has been utilized as a substitute for bauxite in the making of aluminum and for potash minerals in the chemical industry.

⁵² U. S. Bureau of Mines: *Minerals Yearbook 1940*, pp. 538, 505.

⁵³ While the copper reserves of Japan proper are quantitatively adequate for domestic needs, the costs of mining were such that Japanese copper was at a competitive disadvantage in the export market against richer ores from other parts of the world, and, without tariff protection, frequently would have been in the home market also.

⁵⁴ The considerable resources of natural sulphur, which occurs widely throughout the islands in the neighborhood of volcanoes, are supplemented by sulphuric acid produced in the smelting of copper and pyrites. The sulphuric content of the pyrites produced in Japan proper in 1936 was estimated at 750,000 long tons by the British Imperial Institute. See its *Statistical Summary . . . 1936-1938*, p. 359.

THE POPULATION PROBLEM

In recent decades the pressure of population in Japan has been a cause of deep concern. Since the opening of the country to commerce in 1853 the population has been rapidly increasing, and for at least a generation the problem of finding profitable employment for more and more people has been imperatively calling for a solution.

THE HISTORICAL BACKGROUND

After centuries of fierce rivalry among warring clans, the Tokugawa family established supremacy in 1603; they were able to maintain comparative internal peace for more than 250 years thereafter, during which they enforced strict seclusion from contact with the outside world. This should have been a period favorable to the natural growth of population. In fact, during the second half of the period, when records were kept, numbers remained relatively stationary. The official "censuses," probably self-consistent although incomplete, give the following figures for the years 1721 through 1852.

TABLE XVI—JAPAN PROPER: OFFICIAL POPULATION ACCORDING TO THE SEVENTEEN CENSUSES OF THE TOKUGAWA SHOGUNATE, 1721-1852¹

YEAR	POPULATION	YEAR	POPULATION
1721	26,065,000	1780	26,011,000
1726	26,549,000	1786	25,086,000
1732	26,922,000	1792	24,891,000
1744	26,153,000	1798	25,471,000
1750	25,918,000	1804	25,622,000
1756	26,062,000	1834	27,064,000
1762	25,921,000	1846	26,908,000
1768	26,252,000	1852	27,201,000
1774	25,990,000		

The reasons for this stability were basically economic. The local autarchy of each feudal estate and the rigidity of the checks upon movement within it permitted only subsistence agriculture and the simplest handicrafts. Pestilence, famine, and natural disasters were, therefore, peculiarly destructive, and social habits tended toward deliberate "thinning" of the population through abortion, infanticide, exposure of the aged, and a ready use of the death penalty.

This self-contained, compartmental society was ripe for change when Commodore Perry entered Japanese waters in 1853 and secured for his

¹ From Ishii: Population Pressure . . . p. 7.

country the right to trade which for over two hundred years had been denied to foreigners, with the exception of concessions to the Chinese and Dutch in two treaty ports. The release of the expansive spirit was almost immediately reflected in a rapid growth in population. The census of 1852 had recorded 27,200,000, or a probable total of 30,000,000 after allowance has been made for omitted groups. By 1868 the total population had reached approximately 33,000,000.

TABLE XVII—JAPAN PROPER: "ESTIMATED ACTUAL POPULATION" 1872 TO 1915²

YEAR	POPULATION
1872	34,806,000
1875	35,316,000
1880	36,649,000
1885	38,313,000
1890	39,902,000
1895	41,557,000
1900	43,847,000
1905	46,620,000
1910	49,184,000
1915	52,752,000

In 1869 the feudal system which had rested upon the local rule of the clans was completely abandoned, the basis of land ownership was transformed, and the Emperor restored to supreme power. Personal freedom and economic opportunity swept away the controls which had formerly kept the population static, and, in the early years of Emperor Meiji's reign, the government set about reducing the death rate of infants and aged people. The totals of "Estimated Actual Population" from 1872 to 1915, though not comparable in accuracy with later census data, indicate the burst of growth which accompanied Japan's Industrial Revolution.

THE MODERN PERIOD

The first adequate census of population was made in 1920; and it has been followed by similar enumerations at five-year intervals, which enable students of the problem to describe the population in this period and to define its trend with some exactitude.

A population increasing rapidly, though since 1930 at a slackening rate, is indicated in the returns (see Table XVIII).

The factors in this growth are a birth rate which rose until 1920 and a death rate which was slowly falling from 1918 until 1935.³ Refined meas-

² For basis of estimate, see *Ibid.*, p. 53.

³ Ishii: *op. cit.*, pp. 110, 114, 115; Pelzer: Population . . . p. 29.

ures indicate that the birth rate established a definite downward trend in 1920.⁴ As the momentum of the earlier rapid rise continues through the productive lifetime of the larger new generations, Japan's population would normally be expected to increase until about 1970. By western standards, the death rate, even in 1935, was high for all groups in the population and especially for infants, youths, and females of every age below middle life.⁵ The drastically reduced rate of growth in 1940 reflects both a drop in the

TABLE XVIII—JAPAN PROPER: TOTAL POPULATION RECORDED IN QUINQUENNIAL CENSUSES,
1920 TO 1940

YEAR	POPULATION	GROSS INCREASE	RATE OF GROWTH
1920	55,963,053		
1925	59,736,822	3,773,769	6.7 percent
1930	64,450,005	4,713,183	7.9 percent
1935	69,254,148	4,804,143	7.5 percent
1940	73,114,308	3,860,160	5.6 percent

Source: *Toyo Keizai*, as quoted in *Contemporary Japan*, Vol. 10, p. 817.

birth rate and an increase in the death rate of the civilian population; it gives no clue, however, to military casualties, for "every man called to the colours was dealt with as still remaining in his *shotai* or home."⁶ This rather ghostly total is, therefore, subject to downward revision.

Urban and rural groups have shared most unequally in the growth of population.⁷ Urban population (i. e., that in communities of 10,000 or more) has doubled in the twenty-year period while rural population has declined

⁴ Penrose: *Japan* . . . p. 104.

⁵ Penrose: *op. cit.*, pp. 87-92.

⁶ *Contemporary Japan*, Vol. 10, p. 817.

TABLE XIX—JAPAN PROPER: PROPORTIONS OF URBAN AND RURAL POPULATION
IN 1920, 1935, AND 1940

YEAR	TOTAL POPULATION	URBAN POPULATION	PERCENT OF TOTAL	RURAL POPULATION	PERCENT OF TOTAL
1920	55,900,000	18,000,000	32	37,900,000	68
1935	69,300,000	31,700,000	46	37,600,000	54
1940	73,100,000	36,400,000	49	36,700,000	51

Sources: data for 1920 from the *Japan Yearbook 1926*, p. 52; data for 1935 from the *Japan Yearbook 1940-1941*, p. 47; data for 1940 from *Toshai Mondai*, as quoted by McCune: Recent Growth of Japanese Cities, pp. 164, 165.

both in absolute and relative numbers. Among the urban groups, there seems to have been a fairly direct relation between size and rate of growth. The larger the community, the faster the rate at which it grew; since 1935, the pace has moderated somewhat irregularly.⁸ Concentration in large units has gone so far that in 1940 nearly one-fifth of the population (14,400,000 or 19.7 percent of the national total) lived in "The Six Great Cities"—Tokyo, Osaka, Nagoya, Kyoto, Yokohama, and Kobe.⁹

These urban centers of the southern coast attract surplus rural population from all parts of Japan. Of the predominantly rural geographical regions, only Hokkaido shows a consistent gain—the result of carefully fostered immigration. The complexity in local rates of change, on the other hand, is made apparent in Dr. Kiss's population map of the islands of Honshu, Shikoku, and Kyushu (see Plate I reverse).¹⁰

⁸ TABLE XX: JAPAN PROPER: RATES OF GROWTH OF PRINCIPAL URBAN GROUPS BETWEEN 1920 AND 1935 AND BETWEEN 1935 AND 1940.

GROUP	AVERAGE OF RATES OF GROWTH BY 5-YEAR PERIODS 1920-1935	AVERAGE RATE OF GROWTH 1935-1940
Japan proper	7.4 percent	5.6 percent
6 largest cities	18.6 "	12.5 "
12 cities over 200,000	16.5 "	10.2 "
29 cities between 200,000 & 100,000	13.1 "	10.8 "
57 cities between 100,000 & 50,000	12.6 "	5.9 "
78 municipalities under 50,000	9.7 "	6.1 "

Source: *Toshai Mondai*, as quoted by McCune: *op. cit.*, pp. 164, 165.

⁹ TABLE XXI—JAPAN PROPER: THE POPULATION OF THE SIX GREAT CITIES AS A GROUP IN RELATION TO TOTAL POPULATION AND TOTAL URBAN POPULATION IN THE CENSUSES OF 1920, 1935, AND 1940

YEAR	TOTAL POPULATION	TOTAL URBAN POPULATION	POPULATION OF THE "SIX"
1920	55,900,000	18,000,000	5,500,000
1935	69,200,000	31,700,000	12,600,000
1940	73,100,000	36,400,000	14,400,000

Source: *Toshai Mondai*, Vol. 32, pp. 1148-1167, as translated by Shannon McCune.

¹⁰ NOTES ON A MAP OF POPULATION CHANGES IN JAPAN

The map represents comparative rates of local population change in Honshu, Shikoku, and Kyushu during the period between 1920 and 1935. The principle of its construction was to compile the statis-

THE PROBLEM

The dilemma is to find productive occupation for the increasing numbers for the next twenty or thirty years. It is usually conceded that the

tics of population for the smallest available civil divisions and to classify their respective areas according to type of change. The map indicates actual administrative areas each characterized by one of four broad population trends.

The data used are those of total standing population in 1920 and in 1935 on the days considered the "crucial census periods," as given in the volumes of the *Census of Japan* for 1920 and 1935 for cities, towns, and villages or townships. From them the rate of increase or decrease of the population in each administrative unit during the period, 1920 to 1935, was calculated and the percentages plotted on a map bearing the administrative divisions.

In the study of population movements, three great types of increase may be observed. First, there are areas where the increase of population is slow, sometimes barely enough to justify placing the area above the stationary stage. On the other hand, there are areas where increase of population assumes proportions exceptional in the rest of the country. A third group of areas is characterized by an intermediate rate of increase.

In converting the map of crude percentages into a map summarizing population change, four categories were arbitrarily selected. Decrease of population was set apart as *Category I*, and increase of population was divided into *Categories II, III, and IV*, according to the type of increase. As the upper limit of the division of minimum increase, *Category II*, the median rate of increase of the 45 prefectures in Honshu, Shikoku, and Kyushu, or 17.8 percent, was selected. As the upper limit of the division of intermediate increase, *Category III*, the rate of increase for the total population of Japan proper, or 23.8 percent was chosen. The division of maximum increase, *Category IV*, includes all the areas with a rate of increase exceeding 23.8 percent. In plotting the map, each local administrative area was represented with a symbol indicating into which of the four categories its rate of population change fell.

The areas where depletion of population occurred (*Category I*) are located, for the most part, west of a line connecting Tokyo with Niigata. East of this line decrease can be observed chiefly in remote mountain districts and occasionally in the immediate neighborhood of urban areas. West of the line, areas of an actual decrease of population include a sizeable portion of the Kinai area of west-central Honshu, most of extreme western Honshu, central Shikoku, and several areas in Kyushu.

The minimum rate of increase (*Category II*) is areally the most widespread, being predominant over most of the mountainous parts of northern and central Honshu, the Kinai district, eastern and western Shikoku, and large areas in Kyushu.

The "average" rate of increase (*Category III*) is represented only in small patches of Honshu, especially in the northeastern third, and in central and southern Kyushu.

The areas presenting a rate of increase above the average (*Category IV*) are rather strongly localized in northeastern Honshu, some of the intermontane basins of the Japanese Alps, a band of territory between Tokyo and Nagoya, the Kinki district of Osaka Plain, the industrial area of northern Kyushu, and parts of the central and southern portion of that island. The most important are the urban areas, particularly Tokyo-Yokohama, Nagoya, Kyoto, and Osaka-Kobe. This category of increase is conspicuously absent in western Honshu and most of Shikoku.

It has been pointed out by competent students, both Japanese and foreign, that statements concerning "astonishing" rates of increase must be regarded critically. The picture of Japan as an area of teeming millions, multiplying at a rate unseen in other parts of the world, has to be discarded altogether. The rate of growth of the Japanese population has not exceeded the rates observed in western countries in periods of great industrial development. (See Kiss: *Le Problème de la population au Japon*.)

This map primarily reveals the complex process of growth. It draws attention not only to the high rate of increase of certain areas but simultaneously to the net drain of many other areas. It also gives valuable clues to the growth of population in regions like the Ou district, where the increase is not justified by the marginal character of agriculture and the almost total absence of industry.—GEORGE KISS.

resources of Japan proper could, with difficulty, provide subsistence in the form of rice, fish, and vegetables; but agriculture and fishing cannot provide a means of livelihood for all these people or maintain a civilized standard of living. The problem can be solved only by industrial or territorial

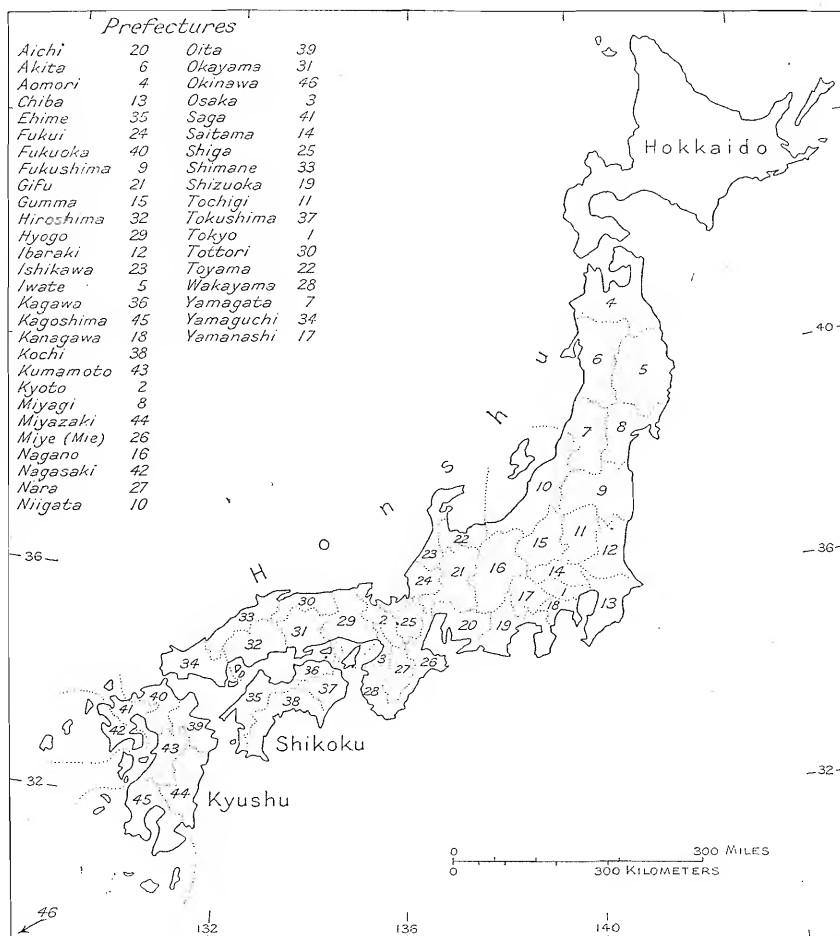


FIG. 3—Japan Proper: Location Map of Prefectural Boundaries. From the *Resumé Statistique de L'Empire du Japon 1939* and the maps in the *Japan Times Yearbook 1933*.

expansion. Since 1931 the advocates of the peaceful pursuit of the first alternative have been overridden and displaced by the proponents of the second.

The palliative of emigration long appealed to the Japanese authorities. Several formidable barriers prevented its full application, however. These were: first, the preference of the Japanese for warm climates, which made

TABLE XXII—WESTERN PACIFIC AREA: POPULATION, AREAS, AND DENSITIES¹¹
(E—ESTIMATE; C—CENSUS)

COUNTRY	DATE OF CENSUS OR ESTIMATE	POPULATION (IN THOUS.)	AREA IN THOUS. SQUARE MILES*	DENSITY: PERSONS PER SQUARE MILE
Japan Proper	1935 C	69,254	146	474.3
Korea	1935 C	22,899	85	269.4
Formosa	1935 C	5,212	14	372.1
Karafuto	1935 C	332	14	23.7
Japanese Empire	1935 C	97,698	259	377.2
Kwantung Leased Terr. and SMR Railway Zone	1935 C	1,657	1.45	1,141.1
South Sea Man- dated Islands	1935 C	103	0.83	124.1
Manchuria	1939 C	39,454	503	78.4
China†	1936 E	427,330	3,998.5	106.8
Indo-China	1936 E	23,030	285.8	80.6
Str. Settlements	1938 E	1,358	1.4	97.0
Fed. Malay States	1938 E	2,090	27.5	75.9
Unfed. "	1938 E	1,817	22.3	81.4
British Malaya	1937/38 E	5,174	51.2	101.1
Java & Madura Outer Provinces	1930 C	41,718	51	818.0
	1930 C	19,009	684	27.8
Netherlands Indies	1938 E	68,400	735	93.1
	1930 C	60,727	735	82.6
Philippines	1939 C	16,000	114	139.9
Thailand	1937 C	14,465	200	72.3
U.S.S.R.	1939 C	170,467	8,168	20.9
Australia	1939 E	7,021	2,975	2.3
New Zealand	1939 E	1,625	103	15.8

* Land area exclusive of inland waters.

† Excluding Manchuria and Jehol.

¹¹ From Pelzer: Population and Land Utilization, p. 3, Table I.

them reluctant settlers of Hokkaido, Karafuto, and Manchuria; second, the already existing density of population in the warmer parts of the outlying Japanese Empire—Korea and Formosa; and third, restrictions against the immigration of Japanese or their full exercise of economic citizenship in the less crowded areas of suitable climate in the Pacific—Australia, the East Indies, the Philippines, Hawaii, the United States. Such has been the force of these barriers that only about one and one-half millions of Japanese were recorded in recent reports as living in the outer Empire;¹² and, among foreign countries, in 1937 there were as many as 100,000 Japanese residents only in Hawaii, the United States, and Brazil.¹³ Before the outbreak of the present war it had been suggested that carefully planned Japanese settlement of certain sparsely populated islands in the East Indies, the South Seas, and the Philippines, and of the shore of Australia north of Capricorn would have proved generally advantageous.¹⁴

Failing of entry into these and other areas of warm climate where the standard of living is higher than at home, the Japanese leaders have held that to solve their population problem they had no choice but to obtain territorial expansion by force. In this connection, it is interesting to note the alarm of national spokesmen at the recent sharp fall in the birth rate. The anonymous gentleman who made public the results of the 1940 census expressed consternation.

Judging from all the available data . . . a gradual fall in our population-increase is inevitable, admitting at the same time that the observations of the present census are attributable to some special factors.

A campaign to combat this deplorable state of things has of late been put into motion in the country, and, as a consequence, various measures for increasing our birth rate are

¹² TABLE XXIII—JAPANESE RESIDENTS IN OUTER PARTS OF THE JAPANESE EMPIRE

DATE OF RECORD	POLITICAL UNIT	NUMBER OF RESIDENT JAPANESE
1938	Korea	333,288
1938	Formosa	308,845
Dec. 31, 1937	Manchukuo	417,759
June 30, 1939	South Sea	
	Mandated Islands	73,028
"End of 1938"	Karafuto	329,743
"End of 1938"	Kwantung Leased Territory	180,689

Source: Data from the *Japan Yearbook 1940-1941*, pp. 859, 882, 929, 914, 903, 930.

¹³ Pelzer: *op. cit.*, p. 37.

¹⁴ Crocker: The Japanese Population Problem, pp. 198-203; Pelzer: Japanese Migration . . . pp. 155-194.

being studied. If some effective measures to this end are worked out, the downward tendency of our population-increase will have been checked.¹⁵

The campaign to be thus "drastically enforced" is described in detail in another Japanese publication, *Contemporary Opinions on Current Topics*.

The government's population-increase program adopted recently deserves our whole-hearted support. The government intends to increase Japan proper's population from 72,000,000 at present to 100,000,000 by 1960, to improve the nation's physical construction and mental capacity, and to effect proper distribution of Japanese among East Asiatic races.

With regard to the birth rate, it is explained, the goal is twofold: first, to reduce the average age of marriage by three years (from the present average of 28 years for men and 24 years for women); and, second, to urge each couple to have at least five children. To achieve this goal the following means are to be employed:

- Maintenance of the family system;
- Advance of marriage funds;
- Protection of maternity;
- Prohibition of the employment of women older than 20 years;
- Protection of pregnant women and nursing babies;
- Restriction and prohibition of birth control;
- Aid to families with many children;
- Establishment of marriage agencies.¹⁶

For the present leaders of Japan, clearly, the fear that in the future their people may be at a greater numerical disadvantage to other Asiatic races far outweighs their concern lest the means of life run short at home.

¹⁵ *Contemporary Japan*, Vol. 10, p. 818.

¹⁶ *Contemporary Opinions on Current Topics*, No. 369, p. 7.

INDUSTRIAL JAPAN

In the chapter dealing with the population problem, it has been suggested that the general standard of living in Japan could be maintained or raised only by industrial or territorial expansion. We may now consider what success there has been with the first of these solutions.

There has been a spectacular industrial expansion in the last generation and especially since 1929. In 1913 Japan occupied the fifteenth place among the nations of the world in the tonnage of steel produced; in 1926 the eleventh place; in 1931 the seventh place; and in 1936 the sixth place, behind the United States, Germany, Russia, the United Kingdom, and France.¹

In a country lacking primary materials, especially mineral materials, industrial production is inevitably dependent upon foreign trade. The gist of the problem was well stated by Mr. W. R. Crocker in 1930: "What goods can Japan put these people to manufacturing (and manufacturing at prices set by fierce international competition) which foreign markets will buy?"² He correctly foresaw a permanent shrinkage in the volume of international trade as more and more countries produced an enlarging share of their own supplies of manufactured goods.³

Even in 1936 Japan differed in many essential respects from Western industrial nations. As a result of the rapidity, recency, and unevenness of the transformation, paradoxes abounded to startle the Occidental observer. The portion of the population engaged in manufacturing was less than a quarter of the gainfully employed, and more than half were engaged in home workshops or small plants employing less than five people.⁴ There was no fixed class of industrial labor; the principal reserve consisted of constantly recruited detachments of agricultural workers, many of whom planned to return to their farms when they could. Neither was there a considerable class of independent investors; a few powerful families and the national government controlled the banking system and the flow of capital. Familial attitudes persisted in the various forms of industrial organization. Employer and employed alike accepted with little question the assumption of a paternal authority and responsibility not only by the head of the family workshop but by the master of apprentices in the moderate-sized establish-

¹ League of Nations: *Statistical Yearbook 1933-1934*, p. 131, and *Idem: Statistical Yearbook 1939-1940*, p. 145.

² Crocker: *op. cit.*, p. 207.

³ *Ibid.*, p. 138. See also Clark: *op. cit.*, p. 457.

⁴ Hubbard: *Eastern Industrialization . . .* p. 114.

ment and by the proprietor of the large factory, where dormitories and elaborate welfare services were often provided. The government, too, in fostering new or strategic industries assumed a directly paternalistic role quite strange to the liberal governments of Western nations. Finally, the acquiescence of the workers in a life of few material rewards and their almost limitless industry and patience were in marked contrast to the individualism of the democratic West.

HISTORICAL SKETCH

These paradoxes may be partially explained by the historical development of Japanese industry. Before 1853 trade had been narrowly limited, and the Industrial Revolution had barely penetrated the seclusion of the Tokugawas, for in each locality crafts requiring simple tools, but often a high degree of skill, largely sufficed. These were based upon agriculture, wood-working, and a small amount of metal work. After 1853 when the forcible entry of the Western traders had destroyed the old equilibrium, the Meiji government decided to adopt their industrial methods. As capital funds were scarce and investment by aliens was frowned upon, the process began slowly. At first the traditional trades were predominant: the manufacture of household wares, clothing, building materials, and agricultural implements of native style for the home market, and of silk, cotton, and woolen textiles, pottery, toys, and miscellaneous small articles, such as buttons and matches, for both domestic and foreign consumption. A small iron industry and the mining of coal, copper, and sulphur were established early; but the fact that until 1910 the customs tariff was only partly controlled by the Japanese government prevented effective protection. A sheltering tariff was then erected, however, and by the time of the first World War a sturdy growth was ready to benefit from its stimulus.

The rapid expansion of Japanese industry during the war years, when European traders temporarily withdrew from the Asiatic market, was arrested in the early twenties when the more experienced competitors returned to the scene. A period of retrenchment, accompanied by improvements in Japanese industrial efficiency, followed. A brief boom, based upon rebuilding after the earthquake of 1923 and upon the exportation of raw silk and cotton textiles, led to many new ventures in the mid-twenties. In 1927 a financial panic touched off a second period of contraction, intensified by deflationary measures preparatory to an attempt to return to the

gold standard in 1930 and by the collapse of the American market for raw silk in 1929.

As a consequence, the world-wide depression was especially acute in Japan. The agricultural population suffered severely, and industrial producers were forced to study, and give effect to, drastic economies. The thorough rationalization of industry and the flood of labor from the impoverished countryside which resulted enabled Japanese manufacturers to cut their costs to a minimum. When in 1932 the yen depreciated farther and faster than the currencies of rival exporting countries, Japanese producers could thus offer their goods at amazingly low prices in world markets. Cheap Japanese cotton and rayon textiles, rubber-soled shoes, bicycles, and the like found a ready sale among the people of low purchasing power not only in neighboring Asia but in remote corners of the world. Although the monetary advantage was a temporary one, the Japanese success created universal alarm among competing exporters; to prevent the actual or threatened demoralization of markets, barriers against Japanese goods were raised in nearly every country during the decade.

Within Japan, also, it was a decade of struggle, for the territorial expansionists, having embarked upon their Manchurian adventure in 1931, were using every influence at their command to create a self-sufficient economy capable of producing the munitions of war in volume. At a number of points their interests were in direct conflict with those of the exporting industrialists. The latter required for their prosperity low food prices at home, cheap transportation, nominal import duties for raw materials and equipment unobtainable from Japanese sources, light taxation of industry and trade, a stable currency, easy credit, peaceful relations with foreign customers, and the elimination of trade barriers in foreign markets. The policy of the territorial expansionists, who found their chief support in the farming population, tended in the opposite direction in nearly every particular, for the costly armament program and the development of seized territory involved the government in expenditure so heavy as to draw off the normal supply of funds and to press upon every source of revenue. It was not certain until after the *coup d'état* of 1936 which policy would prevail.

In the following study of Japanese industry and trade, we shall center our attention upon 1936 but shall also make comparative observations, whenever possible, of conditions in 1929, a year of prosperity in the twenties, and in 1939, a year of war conditions accompanied by advanced inflation and governmental control.

GEOGRAPHICAL LOCATION

The general industries of modern Japan grew up, for the most part, in and around older cities, usually seaports. These, by the mid-thirties, had been expanded and transformed. Osaka, a regional port, originally the transhipment point for the old capital, Kyoto, had become the chief manufacturing city of the country. Cotton spinning was the largest of its widely diversified industries, although there were some blast furnaces and a number of steel mills. Kyoto itself was famous for its silk weaving and artistic trades. The district was served by the deep-water port of Kobe, the chief foreign trade port of Japan and a center of shipbuilding.

In a similar way, a variety of industries were attracted to Tokyo, the modern capital and another regional port, much used by coastal shipping. Airplane factories were especially notable. The district was served by the deep-water harbor of Yokohama, the second foreign trade port of the country and the headquarters of the silk export trade. Shipbuilding, also, was important. Nagoya, another port of the pre-industrial period, had become the distributing center for a manufacturing hinterland, textiles and pottery being the specialities among the wide range of its products.

The location of the silk-reeling and the heavy industries was determined by other considerations. In the highland valleys of central Honshu, where the steep slopes were unsuitable for food crops and where water power was abundant, the silk-reeling industry was carried on in almost rural conditions: nearly every village had its filature to prepare the local crop of cocoons for shipment to the coastal distributing points.

The heavy industries tended to concentrate about the principal mines. In the west, near the coal region of northern Kyushu the towns of Moiji, Kokura, Wakamatsu, Tobata, and Yahata converged into an almost continuous band of coal and iron wharves, blast furnaces, smelting plants, refineries, coke ovens, cement works, dye factories, and fertilizer factories; farther inland the coal-mining and rail centers of Omuta and Miike were similarly surrounded by industrial plants. In Hokkaido, there were three coal ports, Muroran, Hakodate, and Otaru. Of these only the first, using ore from Korea, China, and the Kutchan mine, supported heavy industry, its speciality being naval equipment. The others contained fish canneries, lumber mills, cement factories, and a few hemp mills. In northern Honshu the Kamaishi mine was surrounded by coke ovens and blast furnaces.⁵

⁵ See Trewartha: *A Reconnaissance Geography* . . . pp. 89-96, 161-171, 177-181, 188-202, 226-235.

STRUCTURAL ANALYSIS

The complex structure of Japanese manufacturing industry as it existed in the mid-thirties has been described in detail by Professor G. C. Allen. The following division into five principal groups is derived from his analysis.⁶

1. Traditional trades in which hand tools were still used for the most part in the production of the small, delicate articles characteristic of the Japanese household for centuries past. These were made by local, independent craftsmen with the help of their families in home workshops and were sold there directly to the consumer. Such products as straw mats (*tatami*) and paper screens (*shoji*) were of this nature.

2. Traditional or Western trades adapted to production in somewhat more highly organized workshops, where simple motor-driven machinery was used in conjunction with hand tools. The number of employees varied from one or two to thirty, and some tasks were regularly given out as homework. One of these enterprises could be set up with a comparatively small investment, and in the fierce, unregulated competition that prevailed much of the work was done under deplorable conditions. Middlemen, who sometimes acted as contractors also, distributed the products to the larger shops and department stores which served the home market, and to representatives of the exporting houses. Japanese-style pottery and lacquerware, electric light bulbs, bicycle parts, and rubber-soled shoes were among the articles most often produced in this way.

3. Factory production of traditional goods for home or export markets in fully mechanized, medium-sized establishments. Silk-reeling, the weaving of silk cloth and of narrow Japanese-style cotton cloth, and the making of chinaware were typically carried on in such factories. Individual ownership of the mills and an intricate system of distribution were the rule.

4. Mass production of Western-style consumers' goods in moderate-sized and large factories. The spinning of cotton and other yarns, the weaving of plain cotton, rayon, and woolen cloth, and the knitting of cotton, woolen, and mixed material were important. The magnitude of the investment in massive, power-driven machinery frequently led to centralized control, and considerable vertical integration was to be found. In the cotton industry, for instance, there was a high degree of coördination among the groups engaged in the importation of raw cotton, the spinning of yarn, the weaving of simpler kinds of cloth, and the distribution of the finished product through trading companies to the home and export market.

5. The heavy industries producing a wide range of producers' goods. The construction and operation of the large units required resources beyond the scope of the individual entrepreneur or average firm; hence, a few wealthy family groups, collectively known as the *Zaibatsu*, and, in the case of iron and steel, the government, also, subscribed the capital and controlled production.

THE CHIEF INDUSTRIAL GROUPS

In the total number of gainfully occupied workers, the proportion engaged in manufacturing industry was much the same in the census years of

⁶ See Allen: Japanese Industry . . . to 1937, pp. 491-642.

1920 and 1930,⁷ and the relative number of those employed in each of the larger industrial groups remained fairly stable.⁸ However, the factory statistics show that changes occurred rapidly after 1930.⁹ Tables XXVI-XXVIII indicate that in the second half of the thirties the primacy of textiles as measured by numbers employed in factories was declining and that the industries producing metals, machinery, and tools, if treated as one, had taken first place in the value of factory output and of capital invested.

Within the larger industrial groups, changes in the relative importance of the constituent parts were taking place throughout the twenty years. In the cotton industry the chief emphasis shifted from spinning to the weaving first of coarse cloth and then of increasingly fine grades. The silk industry remained concentrated on the reeling process, principally because of its extreme dependence upon the export trade to the United States where raw silk was admitted free but silk tissues were subject to a high rate of duty. In the metal trades, the leading position of copper goods in the twenties yielded to iron and steel in the thirties. During the latter decade the range of new products in the machinery trades was extended every

⁷ TABLE XXIV—JAPAN PROPER: NUMBERS ENGAGED IN THE CHIEF KINDS OF ECONOMIC ACTIVITY ACCORDING TO THE CENSUSES OF 1920 AND OF 1930

KIND OF ACTIVITY	1920		1930	
	TOTAL (in thous.)	PERCENT OF ALL OCCUPIED	TOTAL (in thous.)	PERCENT OF ALL OCCUPIED
Agriculture	14,127	51.8	14,082	48.2
Fishing and Aquiculture	534	2.0	565	1.9
Mining and Quarrying	424	1.6	315	1.0
Manufacturing	5,297	19.4	5,820* (5,707)	20.0 (19.6)
Commerce	3,204	11.8	4,745* (4,857)	16.2 (16.6)
Others	3,675	13.3	3,773	12.6
Total Occupied	27,261	99.9	29,300	99.9

* These are reapportioned by Professor Uyeda to make them comparable to the classifications of 1920. The actual census figures and the percentages derived from them are given in parentheses. The official classification of 1930 placed certain occupations in the "Commerce" section which had been in the "Manufacturing" section in 1920.

Source: Uyeda: *The Growth of Population . . .* opp. p. 16.

⁸ See Table XXV, p. 62.

⁹ The factory statistics present data concerning only those work places that give employment to five or more workers and therefore exclude important sections of the textile and light manufacturing industries.

year. In the chemical industry, the earlier importance of rubber and paper trades was overtaken by that of rayon and industrial chemicals. Changes in the group of miscellaneous industries were chiefly concerned with the gradual replacement of some traditional consumption goods by those of Western style and with the addition of many new articles.¹⁰

The degree of self-sufficiency achieved by Japanese manufacturing in 1936 may be roughly measured by comparing the statistics of production with those of foreign trade (see Table XXIX). The dependence upon

TABLE XXV—JAPAN PROPER: NUMBERS EMPLOYED IN INDUSTRY BY PRINCIPAL GROUPS ACCORDING TO THE CENSUSES OF 1920 AND OF 1930

INDUSTRIAL GROUP	1920		1930	
	NO. EMPLOYED (in thous.)	PERCENT OF TOTAL	NO. EMPLOYED (in thous.)	PERCENT OF TOTAL
Kiln Industries	176.3	3.3	170.5	3.0
Metal Manufactures	452.1	8.5	381.3	6.7
Machine & Tool Manufactures	194.6	3.7	231.7	4.1
Shipbuilding & Vehicle Manufacture	139.3	2.6	188.7	3.3
Watch, Weights & Measures, Scientific & Musical Instrument, and Precious Stone Manufactures	48.6	0.9	55.2	1.0
Chemical Industries	133.9	2.5	160.9	2.8
Textile Industries	1,381.0	26.1	1,455.3	25.5
Clothing & Apparel Manufactures	446.5	8.4	467.6	8.2
Paper-making, Type Manufacture, & Printing	218.1	4.1	271.0	4.7
Leather, Bone, Horn, Shell, & Feather Manufactures	43.1	0.8	32.0	0.6
Wood, Bamboo, Grass & Vine Stalk Manufactures	651.7	12.3	640.3	11.2
Salt Manufacture	24.6	0.5	31.9	0.4
Manufacture of Food, Beverages, & Provisions	501.5	9.5	488.5	8.6
Civil Engineering & Building	727.1	13.7	942.2	16.5
Work in connection with Gas, Water, Electricity, & Other Utilities	92.3	1.7	128.4	2.3
Other Industries	66.1	1.2	71.7	1.3
TOTAL	5,296.9	100.0	5,707.2	100.0
Male	3,728.7	70.4	4,273.3	74.9
Female	1,568.2	29.6	1,433.9	25.1

Source: Uyeda: *loc. cit.*, opp. p. 16.

¹⁰ Allen: Japanese Industry ... to 1937, pp. 489, 490.

TABLE XXVI—JAPAN PROPER: INDUSTRIAL GROUPS CLASSIFIED ACCORDING TO NUMBERS ENGAGED IN FACTORIES IN 1929 AND 1936

GROUP	1929		1936		1939	
	WORKERS (in thous.)	PER-CENT	WORKERS (in thous.)	PER-CENT	WORKERS (in thous.)	PER-CENT
Textiles	999	48	1,028	40		
Metals and Machinery	371	18	704	27		
Chemical Products	126	6	273	11		
Others	598	28	588	22		
Total	2,096	100	2,593	100		

Source: *Factory Statistics*, quoted by Kamii: Industrial Transformation . . . p. 532.

TABLE XXVII—JAPAN PROPER: INDUSTRIAL GROUPS CLASSIFIED ACCORDING TO VALUE OF OUTPUT IN 1929 AND 1936
(In million yen)

GROUP	1929		1936		1939	
	VALUE	PERCENT	VALUE	PERCENT	VALUE	PERCENT
Textiles	2,998	39	3,372	28	4,792	20
Metals and Machinery	1,371	18	3,740	30	10,893	45
Chemical Products	1,078	14	2,202	18	4,161	17
Others	2,270	29	2,944	24	4,614	18
Total	7,717	100	12,258	100	24,460	100

Source: *Far East Yearbook 1941*, p. 360.

TABLE XXVIII—JAPAN PROPER: INDUSTRIAL GROUPS CLASSIFIED ACCORDING TO CAPITAL INVESTED IN 1929 AND 1936
(In million yen)

GROUP	CAPITAL AND RESERVES					
	1929		1936		1939	
	VALUE	PERCENT	VALUE	PERCENT	VALUE	PERCENT
Textiles	1,581	19	1,841	15		
Metals and Machinery	1,195	14	2,512	21		
Chemical Products	953	12	2,029	17		
Others	4,593	55	5,690	47		
Total	8,322	100	12,072	100		

Source: *Statistics of Corporations*, quoted by Kamii: *op. cit.*, p. 521.

imported raw materials is evident. Imports of manufactured articles were insignificant, except in the case of iron and steel, where they consisted chiefly of pig and scrap iron for further manufacture, and in the case of machinery,

TABLE XXIX—JAPAN PROPER: THE PARTICIPATION OF LEADING MANUFACTURING INDUSTRIES IN THE FOREIGN TRADE IN 1936

INDUSTRY	VALUE OF OUTPUT	VALUE OF EXPORTS	VALUE OF IMPORTS
(In million yen)			
Cotton tissues*	865	485	1
Cotton yarn*	840	38	
Wool fabrics*	340	46	10
Rayon, including silk mixtures*	397	149	
Silk fabrics	301	68	
Silk yarn	55	3	
Knitted goods*†		50	
Machinery*	785	175	153
Iron and steel*‡	420	103	207
Sake	276	6	
Wheat flour*	156	18	
Canned foods	61	71§	
Rubber manufacturers*	135	10	
Pottery and porcelain	108	44	
Cement	101	8	
Printing paper*	95		10
Vegetable oil*	91	37	
Glass and glassware	78	26	

Note: These data assembled from several sources should be interpreted only as a general indication of the situation.

* Made largely of imported material.

† Data for output not available; imports negligible.

‡ The data for 1935. Sources: Value of output, Japan: Finance Department: *Economic and Financial Annual 1937*, p. 100; value of exports and imports, Sansom: *Economic Condition . . . 1936*, pp. 119, 128.

§ Includes both canned and bottled foods but excludes all direct exports from floating canneries.

|| Includes tires only.

Sources: (unless otherwise noted) data for output from U. S. Department of Commerce: *Foreign Commerce Yearbook 1938*, pp. 328, 332, 333; data for exports from *Far East Yearbook 1941*, pp. 460–467; data for imports from *Ibid.*, pp. 454–460.

where they were of only moderate importance. Japanese industry had been successfully brought to the point of supplying the domestic market with the greater part of the manufactured articles consumed there. With a few exceptions, production for the export market had not developed as fully.

COMPARATIVE INDUSTRIAL EFFICIENCY

It is a question, nevertheless, whether an industry had been achieved efficient enough to have survived the competition of Western goods in the Japanese market without tariff protection, subsidies direct¹¹ and indirect, and a system of internal taxation "passing lightly over the entrepreneur and industrial capitalist."¹²

In the twenties, the most thoughtful economists were inclined to describe as fundamental such Japanese handicaps as the scarcity of raw materials, the high cost of fuel and transportation, the high rate of interest, the relative inefficiency of labor, and the lack of entrepreneurial experience and technical skill, which placed Japanese producers of inexpensive goods in danger of underbidding by producers in China and India and put Japanese producers of finer goods at a disadvantage in comparison with those of older industrial countries. Did these considerations lose their force in the thirties?

The scarcity of raw materials certainly continued, and, in a measure, the high cost of fuel and transportation. Monetary factors, however, which may not have been sufficiently allowed for in the twenties, altered the financial situation in the early thirties. Not only did the devaluation of the

¹¹ The following subsidies were reported for the fiscal year 1934-1935:

Shipping routes	9,995,764 yen
Improvement of ships	4,250,000
Seamen's relief, lifeboats, etc.	485,000
Aviation	1,819,982
Motor industry	827,902
Oil-boring & distillation	2,258,554
Iron & steel manufacture	1,435,121
Steel balls for bearings	75,295
Armaments research	6,370,949
Photographic industry	400,000
Synthetic indigo	45,182
Raw cotton and wool associations	250,000
Gold production	255,761
Miscellaneous grants for industrial research, organization, etc.	4,485,459
Total	32,955,069 yen

Source: Sansom and Macrae: Economic conditions . . . 1933-1934, p. 44.

¹² Hubbard: Eastern industrialization . . . p. 58.

yen in 1931 stimulate the export trade, but the easy money policy which accompanied "reflation" brought a reduction in the rate of interest.¹³

Unexpectedly, too, Japanese industrialists seemed to catch the knack of modern production methods all at once. Qualified foreign observers agree that between 1929 and 1934 there was a notable increase in the efficiency of industrial labor and in the quality of management in all its aspects. This is revealed not only by Japanese indices of industrial production but by such objective tests as the increase of output per worker. In the cotton industry in 1929 the average number of spindles to each female operative was 46.5; in 1934-1935 it was 61.1. The average number of looms per operative in 1929 was 2.01, and in 1934 it was 2.59 (2.80 in 1931).¹⁴ The average annual output per operative in the spinning mills increased from 7,000 pounds in 1929 to 9,300 pounds in 1935; similarly, the output per operative in weaving mills increased from 36,000 to 49,500 yards.¹⁵ There had been progress in mechanization, the design of machines, plant layout, and scheduling. There had likewise been a weeding out of inefficient managers and a coordination of administrative functions through mergers, cartels, and a variety of trade associations. Changes such as these were typical in greater or less degree of all the large-scale industries.

During the same period, much resourcefulness had been shown in the development of new products, such as rayon, and in the rapidly extended application of hydro-electric power. Many small trades had emerged, adapting the use of power to the old-fashioned home workshop. These producers could not enjoy the advantages and economies open to large-scale enterprise; but by keeping overhead costs low they managed to supply new kinds of merchandise at unprecedently small prices.

The relative efficiency of the metallurgical and machinery industries in 1936 is more difficult to gauge because of the secrecy with which the operations were surrounded. Professor Allen, who investigated factories and interviewed a number of industrialists in Japan, has reached the view that in the ten years from 1929 to 1939 the quality of the product, as well as its variety, was rising and the unit cost, at least that for labor, was declining. He considered Japanese routine machinists, pattern-makers, and welders

¹³ The discount rate which had averaged 8.06 percent during the five-year period from 1921 through 1925 and 5.18 percent in 1932 varied in a narrow range between 3.79 percent and 3.94 percent throughout the thirties. See Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 201, July 1940, p. 32.

¹⁴ Japanese Cotton Spinners' Association quoted in Mitsubishi Economic Research Bureau: *Japanese Trade* . . . p. 100.

¹⁵ Japanese Cotton Spinners' Association quoted in Allen: *Japanese Industry* . . . 1937, p. 649.

the equal of their British counterparts, and Japanese fitters perhaps one-third as good. Although Japanese engineering workers might lack something of versatility and resourcefulness, they had, on the other hand, an especial aptitude for the "erection of structural steel members." In the technical staff there was not yet comparable efficiency, but a marked improvement was unquestionable.¹⁶

A clue to the development of the metal and machinery industries in 1936 is to be found in the list of exports and imports of metal products in so far as these are given in detail in the trade returns.¹⁷ They suggest the conclusion that in 1936 the metal industry of Japan, although dependent on foreign sources for large quantities of primary materials, small quantities of special steels, and the more difficult castings, had attained a considerable degree of independence in the production of all other castings and in metal manufactures, and that in 1939 this independence was more nearly complete. The returns also suggest that the machinery industry of Japan had gained only partial self-sufficiency. Although for the industry as a whole the value of

¹⁶ Allen: *Japanese Industry . . . 1937*, pp. 665, 666.

¹⁷ In the trade returns of Japan proper the products of the metal industry are listed in two classifications: "Ores and Metals" and "Metal Manufactures." The first group consists, apart from ores, in "raw and semi-finished" metals, i.e., ingots and the simpler castings and rolled products—sheets, plates, bars, rails, heavy wire, hoops, ropes, pipes, tubes, and scrap. In this section iron was by far the most important metal in 1936. Large imports of iron ore, pig iron, and scrap iron, valued at 40, 42, and 81 million yen, respectively, in 1936, were not counterbalanced by exports. The trade in "semi-finished" iron products was fairly evenly balanced, however, exports amounting to 76.4 and imports to 72.0 million yen. Imports of other ores were more than double exports in value at 11.1 against 4.3 million yen, and imports of semi-finished metals other than iron outweighed exports, 131.5 to 22.4 million yen. The second classification, "Metal Manufactures," includes more highly processed hardware, such as insulated electric wire, iron nails, screws, bolts, nuts, washers, bearing balls, cable wire, iron chains, cocks and valves, hinges and window fittings, drills, cutlery, needles and pins, pens, electric stoves and heaters, numbering machines, enamelled iron ware, construction materials, agricultural implements, mechanics' tools, and so on. Here exports exceeded imports in value by the wide margin between 76.5 and 10.6 million yen; in 1939 exports had doubled in value at 147.8 million yen, an increase roughly equivalent to the rise in price, and imports had practically vanished, their recorded total value being only 0.8 million yen.

The products of the machinery industry are classified in the Japanese trade returns as "Machinery and Parts" and "Vehicles and Instruments." In 1936, the combined exports outvalued imports by the difference between 174.5 and 153.1 million yen. Within these totals, vehicles and instruments represented the stronger export industry, its exports being 92.5 and imports 61.9 million yen; in the group of machinery and parts there was a slight excess of value on the side of imports, the figures being 82.0 and 91.2 million yen. The trade statistics for 1939 show for the group as a whole a gain in the value of exports, totaling 370.3 million yen, more than equivalent to, and a gain in the value of imports, at 288.2 million yen, somewhat less than, the increase of the general price index of the metals group. In the vehicles and instruments group, there was a gain in exports, which amounted to 161.1 and a drop in imports, which amounted to 38.3 million yen. The group of machinery and parts showed a gain more than equal to the general price rise in both exports, which were valued at 209.2, and imports, which were valued at 249.9 million yen (*continued on the following page*).

exports slightly exceeded that of imports in both 1936 and 1939, the outgoing and incoming articles were not of the same nature, and the imports consisted of necessary articles which the home industry could not yet satisfactorily provide.

It is too soon to make final pronouncement upon the potential productive capacity of Japanese industry. Those foreign observers best in position to form a judgment in the middle and later thirties took, on the whole, a sanguine view. Sir George Sansom, Commercial Counsellor of the British Embassy in Tokyo for many years, expressed the following opinion in 1935.

As to the quality of production in Japan it is impossible to generalize; but it may safely be said that where quality is more important than price Japanese manufacturers are able to compete with foreign manufacturers in a widening range. It would not, except in special circumstances, be wise for those who have to meet Japanese competition to count too much or too long on the present superiority of their own products as if it were something not to be reached or approached.¹⁸

Three stages of maturity in the Japanese engineering industry may be distinguished from the data of trade in its products.

1. Production was in the first stage of maturity in the case of those articles which the native industry was still unable to supply to the home market in requisite quantity and quality and of which imports were therefore of first importance while exports were meagre or non-existent. In 1936 the chief of these included the following either in the form of assembled units or as parts: automobiles, metal-working machines, internal combustion engines, sewing machines, photographic instruments, steam boilers, firearms, watches, and meters.

2. Production was in the second stage of maturity in the case of those articles with which the native industry could just adequately supply the home market and of which both imports and exports were either small or non-existent. The chief articles of this group in 1936 included pumps, printing machinery, cranes, physical and chemical instruments, surgical instruments, and electric batteries.

3. Production was in the third stage of maturity when it had been developed to the point where the home market could be supplied and a quantity exported much larger than that of imports. In 1936 the articles of which the production had reached this stage included: electric motors, dynamos and transformers, spinning machines, weaving machines, locomotives and tenders, telephonic instruments including radio receiving sets, clocks, phonographs, railway carriages and wagons, cycles including motorcycles, steam and other vessels, and other vehicle tires and parts. The value of exports of automobiles and parts exceeded that of any of the items in this list but was less than that of imports. The trade statistics for 1939 lack many details, especially as regards imports. The record of exports indicates that the scope of the Japanese engineering industry was continuing to develop even though its capacity was unequal to carrying the whole burden of the wartime demand of the home market. There were considerable exports of articles which had figured hardly at all in this way in 1936, notably internal combustion engines, metal- and wood-working machines, steam boilers, pumps, printing machinery, cranes, meters, physical and chemical instruments, surgical instruments, measuring instruments, electric batteries, telegraphic instruments, and parts. The group of exports mentioned as being already well established in 1936 increased in aggregate value less than the level of prices rose, but only the exports of clocks and cycles declined perceptibly.

This analysis is based upon the tables published in Japan, Financial Department: *The Annual Return of the Foreign Trade 1936*, and *Idem: The Monthly Return of the Foreign Trade, December 1939*.

¹⁸ Sansom and Macrae: *Economic Conditions . . . 1933-1934*, p. 35.

Four years later, Professor Allen wrote as follows:

Thus, the conclusion must be, not that Japan has reached a higher level of technique and organization than that of Western countries, but that from a low level of attainment in these respects only ten years ago [1929] she has made an astonishingly rapid advance. There is still a gap between her methods and those of her competitors; but the gap has been substantially narrowed in many industries.¹⁹

After 1934 the rise in general industrial efficiency slackened perceptibly, and in 1935 and 1936 it remained more or less stationary; from 1937 on it actually declined, as the strain of the war effort interfered in many ways with normal economic functioning. In the period from 1937 to 1939 the needs of the munitions industries received first priority, export trades came second, agriculture and industries producing for the domestic consumers' market were a poor third, and imports for domestic consumers practically disappeared.²⁰

The problem of finding profitable outlets for the potential capacity of Japanese industry was acute, and failure to solve it led to artificial restriction. In the middle thirties, agreements for the limitation of output were in force in such leading industries as those producing cotton, silk, and woolen textiles, paper, cement, steel, and coal.²¹ The nature of this problem will be apparent from a study of Japanese foreign trade.

¹⁹ Allen: Japanese . . . Condition, p. 44.

²⁰ *Ibid.*, pp. 46-48.

²¹ Sansom and Macrae: Economic Conditions . . . 1933-1934, p. 35.

THE FOREIGN TRADE

The trend of the merchandise trade between 1929 and 1939, measured in current yen, was increasingly upward after 1931 when it had reached the low point in a precipitous dip from its position in 1929 and a less abrupt drop before that from the high point of the twenties in 1925.¹ During the first part of the decade the recorded value of imports was greater than that of exports by a fairly narrow margin, and a more substantial excess of merchandise imports had been characteristic of Japanese foreign trade for the previous eleven years.² In 1935 and in 1938, however, a small surplus of exports appeared, and in 1939 export values surpassed import values by a wide margin for the first time since 1918.

¹ TABLE XXX—JAPAN PROPER AND KARAFUTO: TOTAL VALUE OF EXPORTS AND IMPORTS OF MERCHANDISE ON PRIVATE ACCOUNT FROM 1929 THROUGH 1939

YEAR	EXPORTS	IMPORTS	TOTAL OF EXPORTS AND IMPORTS	EXCESS OF EXPORTS OVER IMPORTS	EXCESS OF IMPORTS OVER EXPORTS
<i>(Values in million yen)</i>					
1929	2,148.6	2,216.2	4,364.9		67.6
1930	1,469.9	1,546.1	3,015.9		76.2
1931	1,147.0	1,235.7	2,382.7		88.7
1932	1,410.0	1,431.5	2,841.5		21.5
1933	1,861.0	1,917.2	3,778.3		56.2
1934	2,171.9	2,282.6	4,454.5		110.7
1935	2,499.1	2,472.2	4,971.3	26.8	
1936	2,693.0	2,763.7	5,456.7		70.7
1937	3,175.4	3,783.2	6,958.6		607.8
1938	2,689.7	2,663.3	5,353.0	26.3	
1939	3,576.4	2,917.7	6,494.0	658.7	

The following notes were appended to the table as published in the source:

1) The figures of exports do not include the articles for ships' use.

2) The values of exports represent the price and packing charges. The values of imports represent the cost, packing charges, freight, insurance and all other expenses incurred up to the time of the arrival at the destination.

3) In this table are not included the figures for the foreign trade of Chosen [Korea] and Taiwan [Formosa].

Source: Japan, Finance Department: *Economic and Financial Annual 1940*, p. 130.

² It has been pointed out that there is some reason to doubt the accuracy of the records and to believe that imports may have been so overstated and exports understated as to exaggerate the margin between them by from 100 to 200 million yen. See Gordon: Japan's Balance of International Payments . . . p. 916.

An important element in the higher values was a rise in prices, especially after 1936.³ The upward movement was far from uniform; the pace of appreciation differed among the principal commodities with the effect that, in general, the prices of goods which had to be imported rose more rapidly than those of goods for export. On May 30, 1936, the Yokohama Specie Bank's combined index of commodity prices (December 1931=100) stood at 147.9; the comparable index of the prices of commodities exported stood at 133.9, but that of commodities imported, at 201.6.⁴ Hence, the foreign trade of 1936, and even more that of 1939, was transacted upon worse terms than had prevailed several years earlier. The rise in price was most marked in the case of metals and the other raw materials of heavy industry, the index of both of which stood at 205. The home-produced foods (with the exception of cereals), textile manufactures, building materials, industrial chemicals, and fuels increased in price more slowly than did the general level. The importance of the price factor should be borne in mind when interpreting the movements of exports and imports expressed in yen.

Another qualification of the foreign trade data arises from the nature of Japanese record keeping. The valuation of imports and exports used in the official statistics is that of their declared value for clearance through the customs. The trade among the parts of the Japanese Empire, which is subject to an assimilated tariff, does not pass through the same channels as the foreign trade. Consequently, the foreign trade statistics of Japan proper include its extra-imperial trade and that of Karafuto but omit all record of imports and exports received from or sent to Korea, Formosa, and the Japanese Mandated Islands.

CLASSES OF COMMODITIES

The foreign trade of Japan proper is officially summarized according to four types of commodities: food products, raw materials, semi-processed

³ In 1936 wholesale prices in Japan had more nearly returned to the level of 1929 than had those in the United States, Great Britain, or British India. As measured by the League of Nations index of wholesale prices in which the price level of 1929=100, Japanese prices in 1936 stood at 90 while those of the United States stood at 85, the United Kingdom at 83, and Calcutta at 65. In 1939 there was a stronger contrast: the Japanese price level had reached 126, while that of the United States had fallen to 81 and those of the United Kingdom and Calcutta had risen to 90 and 76 respectively. See League of Nations: *Statistical Yearbook 1939/1940*, pp. 205-207.

⁴ Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 165, July 1937, p. 28. See also Table XXXV.

TABLE XXXI—JAPAN PROPER AND KARAFUTO: VALUE OF FOREIGN TRADE BY COMMODITY GROUPS IN 1929, IN 1936, AND IN 1939*

GROUP	EXPORTS		IMPORTS		NET EXPORT	NET IMPORT
	VALUE	PERCENT	VALUE	PERCENT		
(Values in million yen)						
1929						
Food products	160.1	7.6	271.2	12.2		III.1
Raw materials	88.7	4.2	1,223.9	55.2		1,135.2
Semi-processed goods	883.8	42.0	355.4	16.0	528.4	
Finished goods	937.3	44.5	345.9	15.9	591.4	
Others	33.8	1.7	17.0	1.0	16.8	
Total, including others	2,103.7	100.0	2,213.4	100.0		109.7
Reexports & reimports	44.9		2.8		42.1	
Grand Total	2,148.6		2,216.2			67.6
1936						
Food products	203.7	7.7	231.2	8.3		27.5
Raw materials	126.6	4.7	1,737.7	63.1		1,611.0
Semi-processed goods	716.4	27.1	476.6	17.3	239.8	
Finished goods	1,563.4	59.1	294.3	10.6	1,269.1	
Others	31.4	1.4	13.5	0.7	17.9	
Total, including others	2,641.5	100.0	2,753.3	100.0		111.8
Reexports and reimports	51.5		10.4		41.1	
Grand Total	2,693.0		2,763.7			70.7
1939						
Food products	432.0	12.1	230.7	7.9	201.3	
Raw materials	183.4	5.1	1,414.1	48.7		1,230.7
Semi-processed goods	948.9	26.6	860.0	29.6	88.9	
Finished goods	1,939.3	54.4	390.6	13.4	1,548.7	
Others	60.7	1.8	19.9	0.4	50.8	
Total, including others	3,564.3	100.0	2,905.3	100.0	659.0	
Reexports and reimports	12.1		12.4			0.3
Grand Total	3,576.4		2,917.7			658.7

* Merchandise trade on private account, exclusive of bullion and specie.

Source: Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 182, p. 33, and No. 201, p. 26.

goods, and finished goods. Although the line of demarcation is arbitrarily drawn in certain cases and the omission of inter-imperial trade obscures the situation, the relative position of the groups serves to indicate the general trend of development. In the years which we are particularly observing, it shows a country nearly self-sufficient in food, deficient in primary materials, and rapidly achieving an advanced, though still incomplete, stage of industrialization (see Table XXXI).

PRINCIPAL EXPORTS

The relative importance of the leading articles of export altered noticeably during the decade of the thirties (see Table XXXII). The high degree of concentration upon raw silk and cotton tissues, observable in 1929, was no longer possible when the American demand for raw silk had diminished and the many foreign markets for cotton tissues had been increasingly barred to Japanese exports. These two, though in reversed order, were still the leading export articles of 1936, but others which had been of minor importance in 1929 accounted for a far larger share. Exports of metal products had risen especially fast. In 1939 both leaders showed declines in the volume of exports: an abrupt rise in the price of raw silk put it once more in first place in spite of a falling-off in quantity of nearly one-quarter; and exports of cotton goods, which had dropped less sharply in volume but without a parallel price rise, were reduced in total value. The metal exports were not reported in detail in 1939; it appears that they had roughly doubled in value since 1936 while the value of all exports increased by less than half.

PRINCIPAL IMPORTS

The dozen leading imported commodities reflect the changing needs of Japanese industry for primary materials, fuel, and mechanized equipment (see Table XXXIII). In 1929 raw cotton was the most valuable, followed by ores and metals and by machinery, vehicles, and instruments, two large groups of approximately equal value. Seven years later, the relative values of raw cotton and of ores and metals had each risen, but that of machinery, vehicles, and instruments had been halved. There were also noticeable increases in imports of other raw materials: mineral oils, crude rubber, wool, and pulp for rayon. In 1939 the import of raw cotton was only about two-thirds its 1936 volume and its relative value was halved; that of ores and metals doubled its proportionate value; and the group of machinery, vehicles, and instruments regained its relative position of 1929.

TABLE XXXII—JAPAN PROPER AND KARAFUTO: VALUE AND PRINCIPAL DESTINATIONS OF LEADING EXPORTS IN 1929, 1936 & 1939

COMMODITY GROUP	1929		1936		1939	
	DESTINATION	VALUE	DESTINATION	VALUE	DESTINATION	VALUE
(Values in million yen)						
Cotton Tissues	<i>All Countries</i>	412.7	<i>All Countries</i>	483.6	<i>All Countries</i>	403.9
	China*	150.1	British India	72.5	British India	62.3
	British India	109.1	Netherlands Ind.	55.4	Netherlands Ind.	53.2
	Netherlands Ind.	42.3	Manchuria	47.2	China proper	11.0
Raw Silk	<i>All Countries</i>	781.0	<i>All Countries</i>	392.8	<i>All Countries</i>	506.8
	United States	755.4	United States	333.9	United States	437.6
	France	13.3	Great Britain	23.6	Great Britain	36.9
	Canada	5.7	France	21.8	France	16.2
Rayon Tissues†			<i>All Countries</i>	149.2	<i>All Countries</i>	137.4
			British India	26.2	Kwantung	25.3
			Kwantung	21.5	British India	19.6
			Australia	18.4	Australia	18.4
Silk Tissues	<i>All Countries</i>	150.0	<i>All Countries</i>	68.0	<i>All Countries</i>	47.4
	Australia	26.3	British India	13.2	Great Britain	7.5
	British India	24.7	Great Britain	8.3	United States	7.4
	United States	17.7	United States	7.5	British India	5.4
Knitted Goods	<i>All Countries</i>	36.7	<i>All Countries</i>	50.0	<i>All Countries</i>	40.2
	British India	9.9	United States	6.8	Netherlands Ind.	6.3
	Great Britain	7.1	Philippine Is.	5.5	Philippine Is.	3.7
	Egypt & Cape Colony	3.8	Great Britain	5.2	Manchuria	3.5
Woolen Tissues	<i>All Countries</i>	4.2	<i>All Countries</i>	46.0	<i>All Countries</i>	51.8
	Kwantung	2.1	Kwantung	13.2	Manchuria	18.4
	China*	1.4	British India	5.1	Kwantung	11.4
	British India	0.4	China proper	3.6	China proper	3.9
Semi-Finished Iron and Steel‡	<i>All Countries</i>	5.3	<i>All Countries</i>	76.4	<i>Not Reported</i>	
	Kwantung	2.7	Kwantung	26.0		
	China*	1.5	China proper	13.9		
	Asiatic Russia	0.5	Netherlands Ind.	5.6		
Iron Manufactures	<i>All Countries</i>	15.2	<i>All Countries</i>	40.3	<i>All Countries</i>	76.3
	Kwantung	3.4	Kwantung	8.7	Kwantung	32.0
	China*	2.4	British India	4.3	Manchuria	19.1
	British India	2.3	Netherlands Ind.	4.2	China proper	10.8
Machinery and Parts	<i>All Countries</i>	13.6	<i>All Countries</i>	82.1	<i>All Countries</i>	209.2
	Kwantung	5.7	Kwantung	41.2	Kwantung	101.0
	China*	5.3	China proper	16.9	Manchuria	63.9
	Asiatic Russia	1.2	Russia	8.0	China proper	37.0

COMMODITY GROUP	1929		1936		1939	
	DESTINATION	VALUE	DESTINATION	VALUE	DESTINATION	VALUE
Vehicles and Instruments §	All Countries	25.1	All Countries	92.4	All Countries	161.1
	Kwantung	10.0	Kwantung	35.7		
	China*	5.7	China proper	14.8		
	British India	5.3	Manchuria	7.0		
Tinned and Bottled Foodstuffs	All Countries	25.7	All Countries	71.1	All Countries	132.0
	United States	11.4	Great Britain	32.4	Great Britain	41.0
	Great Britain	5.5	United States	15.5	United States	32.0
	Kwantung	0.7	France	2.5	Kwantung	15.0
Pottery and Porcelain	All Countries	37.0	All Countries	43.2	All Countries	48.6
	United States	14.5	United States	15.5	United States	11.1
	Netherlands Ind.	4.9	British India	3.7	Manchuria	6.5
	British India	2.6	Australia	2.3	Kwantung	5.6

* "China" in 1929 data includes China proper and Manchuria, but not Kwantung or Hong Kong.

† Rayon tissues were not reported separately in 1929, but were included in "All other tissues" of which the export value was 2.9 million yen, including 1.7 million yen to China proper; 0.5 million yen to Kwantung; 0.2 million yen to Hong Kong. See Japan, Finance Department: *Annual Return of the Foreign Trade, 1929*, p. III.

‡ Not reported in detail in 1939. However, exports of the "Ores and Metals" group in which semi-finished iron and steel is included, amounted to 121.0 million yen in 1939, as compared with 103.1 million yen in 1936 of which semi-finished iron and steel had accounted for 76.4 million yen.

§ Destination not reported in detail in 1939.

|| Does not include tinned fish exported directly from floating canneries.

Sources: data for 1929 from Japan, Finance Department: *Annual Return of the Foreign Trade, 1929*. Data for 1936 from Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 182, December 1938, p. 34, and from Japan, Finance Department: *Annual Return of the Foreign Trade, 1936*. Data for 1939: totals from Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 205, November 1940, p. 29, and Japan, Finance Department: *Monthly Return of the Foreign Trade*, December 1939; distribution from *Far East Yearbook 1941*.

PRINCIPAL TRADING COUNTRIES

China and the United States, the populous nations of which the borders are nearest Japan on either side of the Pacific, have been the mainstays of the foreign trade from its beginning. British India and the Netherlands Indies, populous countries of relative geographical proximity, have normally been next in importance. The trade with the industrially advanced United States has been different in kind from that with the other three countries. Exports to the United States have been dominated by raw silk and a small range of other products.⁵ Imports from the United States

⁵ In 1936 Japanese exports to the United States were valued at 175.8 million dollars, of which the value of raw silk composed 96.9 million dollars. In 1939, the total was 167.5 million dollars, of which the value of raw silk composed 112.4 million dollars. See U. S. Department of Commerce: *Foreign Commerce Yearbook, 1939*, p. 269.

TABLE XXXIII—JAPAN PROPER AND KARAFUTO: VALUE AND PRINCIPAL SOURCES OF LEADING IMPORTS IN 1929, 1936, & 1939

COMMODITY GROUP	1929		1936		1939	
	SOURCE	VALUE	SOURCE	VALUE	SOURCE	VALUE
(Values in million yen)						
Raw Cotton	All Countries	573.0	All Countries	850.5	All Countries	462.0
	United States	276.4	United States	372.4	United States	146.6
	British India	231.1	British India	315.0	British India	121.0
	China*	33.6	Egypt	36.4	China proper	46.8
Raw Wool	All Countries	101.8	All Countries	200.9	All Countries	72.6
	Australia	99.1	Australia	147.5	Australia	51.4
	Great Britain	0.9	New Zealand	18.3	China proper	11.2
	Argentine Republic	0.7	Union So. Africa	17.4	New Zealand	4.4
Pulp for Rayon	All Countries	0.9	All Countries	44.1	All Countries	48.9
	Italy	0.5	United States	22.4		
	Germany	0.1	Norway	13.6		
	Great Britain	0.1	Finland	4.4		
Ores and Metals†	All Countries	246.8	All Countries	374.9	All Countries	848.5
	United States	58.0	United States	121.9		
	Germany	37.8	British India	32.0		
	Great Britain	27.7	Canada	30.3		
Mineral Oils‡	All Countries	93.0	All Countries	182.8	All Countries	255.5
	United States	50.5	United States	119.1		
	Netherlands Ind.	28.2	Netherlands Ind.	44.0		
	Asiatic Russia	4.8	Asiatic Russia	10.8		
Coal	All Countries	43.0	All Countries	51.1	All Countries	78.4
	Kwantung	26.4	Manchuria	26.7	China proper	48.6
	China*	7.6	China proper	12.6	Manchuria	16.4
	Fr. Indo-China	7.3	Fr. Indo-China	11.7	Fr. Indo-China	13.3
Wood and Timber	All Countries	88.8	All Countries	55.5	All Countries	32.3
	United States	67.3	United States	32.2	Philippine Is.	10.4
	Asiatic Russia	10.3	Philippine Is.	7.3	United States	9.4
	Canada	5.1	Canada	6.2	Canada	5.2
Crude Rubber and Gutta Percha	All Countries	33.9	All Countries	73.0	All Countries	57.5
	Str. Settlements	22.8	Str. Settlements	23.7	Str. Settlements	19.0
	British India	8.8	Netherlands Ind.	22.9	Netherlands Ind.	16.2
	Netherlands Ind.	1.9	British Malaya	19.4	Fr. Indo-China	0.4
Machinery and Parts§	All Countries	121.1	All Countries	91.2	All Countries	249.9
	United States	41.9	United States	38.5		
	Great Britain	34.3	Germany	24.5		
	Germany	21.1	Great Britain	16.4		

COMMODITY GROUP	1929		1936		1939	
	DESTINATION	VALUE	DESTINATION	VALUE	DESTINATION	VALUE
Vehicles and Instruments §	All Countries	65.7	All Countries	61.9	All Countries	38.3
	United States	40.2	United States	41.0		
	Great Britain	7.0	Germany	8.5		
	Germany	7.0	Great Britain	4.4		
Oil-Yielding and Other Seeds	All Countries	30.8	All Countries	44.9	All Countries	31.9
	China*	19.9	Manchuria	23.5	Manchuria	25.5
	Kwantung	6.7	China	14.3	China	2.2
	British India	3.0	Netherlands Ind.	3.8	British India	1.3
Beans and Peas	All Countries	78.7	All Countries	82.6	All Countries	123.6
	Kwantung	63.5	Manchuria	73.0	Manchuria	119.8
	China*	12.1	China	4.6	China	2.5
	British India	2.5	British India	4.2	Kwantung	0.6

* "China" in 1929 data includes China proper and Manchuria, but not Kwantung or Hong Kong.

† Ores and Metals total for 1939 from Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 205, November 1940, p. 29.

‡ Total for 1939 is unitemized balance of "Oils, Fats, Waxes, and Manufactures" in the *Monthly Return*, December 1939, p. 51. All 1936 groups except mineral oils and "All Others" (1.5 million yen in 1936) are otherwise accounted for. In 1939 the total of the whole group was 262.5 million yen; of this items given in detail corresponding to similar items in 1936 accounted for 7.0 million yen, leaving a balance of 255.5 million yen corresponding to the mineral oil and "all other" items in 1936. In that year "All Other" was insignificant—1.5 million yen.

§ Not reported in detail in 1939. Group total from Mitsubishi Economic Research Bureau: *Monthly Circular*, November 1940, p. 29.

Sources: data for 1929 from Japan, Finance Department: *Annual Return of the Foreign Trade*, Data for 1936 from Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 182, December 1938, p. 34, and from Japan, Finance Department: *Annual Return of the Foreign Trade, 1936*. Data for 1939: totals from Mitsubishi Economic Research Bureau: *Monthly Circular*, No. 205, November 1940, p. 29, and Japan, Finance Department: *Monthly Return of the Foreign Trade*, December 1939; distribution from *Far East Yearbook 1941*.

included raw materials for industry (especially cotton), machinery, and iron and steel manufactures. In 1929 the share of the Japanese foreign trade transacted with the United States amounted to 35.9 percent, with exports first in value. By 1936, as a result of the fall in the American demand for raw silk and the increased Japanese demand for ores, metals, and petroleum, the American trade had decreased to only 26.4 percent of the total, and imports had become preponderant in value. In 1939 the United States trade maintained approximately the same relative value, the share being 25.3 percent, still with an excess of imports, but it no longer occupied first place as in 1929 and 1936. That position had been taken by the Chinese trade.

TABLE XXXIV—JAPAN PROPER AND KARAFUTO: DISTRIBUTION OF THE FOREIGN TRADE AMONG
SOME PRINCIPAL TRADING COUNTRIES IN 1929, IN 1936, AND IN 1939

COUNTRY	EXPORTS		IMPORTS		NET EXPORT	NET IMPORT
	VALUE	PERCENT	VALUE	PERCENT		
(Values in million yen)						
<i>1929</i>						
China	471.2	21.9	376.3	17.0	94.9	
United States	914.1	42.5	654.1	29.5	260.0	
British India	198.1	9.2	288.1	13.4		90.0
Great Britain	63.2	2.9	153.1	6.9		89.9
Germany	13.4	0.6	157.3	7.1		143.9
Total	1,660.0	77.1	1,628.9	73.9	31.1	
All others	488.6	22.9	587.3	26.1		98.7
Grand Total	2,148.6	100.0	2,216.2	100.0		67.6
<i>1936</i>						
China	657.7	24.4	394.3	14.3	263.4	
United States	594.3	22.1	847.5	30.9		253.2
British India	259.1	9.6	372.0	13.4		112.9
Great Britain	147.3	5.5	72.9	2.8	74.4	
Germany	35.1	1.3	115.5	4.2		80.4
Total	1,693.5	62.3	1,802.2	65.2		108.7
All others	999.5	37.1	961.5	34.5	48.0	
Grand Total	2,693.0	100.0	2,763.7	100.0		70.7
<i>1939</i>						
China	1,747.1	48.9	683.0	23.4	1,064.1	
United States	641.5	17.9	1,002.4	34.3		360.8
British India	211.0	5.9	182.3	6.2	28.7	
Great Britain	132.0	3.7	24.4	0.8	107.6	
Germany	25.0	0.7	141.0	4.8		116.0
Total	2,756.7	77.1	2,033.1	69.5	723.6	
All others	819.7	22.9	884.6	30.5		64.9
Grand Total	3,576.4	100.0	2,917.7	100.0	658.7	

* Merchandise trade on private account exclusive of bullion and specie.

Sources: data for 1929, *Japan Yearbook 1931*, pp. 452, 453. Data for 1936 and 1939, *Japan Yearbook 1940-1941*, p. 371.

Before the war between the two countries, Japanese exports to China consisted chiefly of textiles, light manufactures, and food products while imports consisted of raw materials: cotton, wool, coal, iron ore, other metals. In 1929, 19.4 percent of the foreign trade was transacted with China (omitting Hong Kong), and exports were the more valuable. In 1936 the relative proportion was similar, being 19.2 percent of the total, again with a slight margin of exports. In 1939 with the war in progress, the value of the Chinese trade had risen relatively to that of other countries and occupied first place, constituting 37.4 percent of the total with a wide margin of value in favor of exports, among which manufactures of machinery and iron and steel products figured prominently.

THE TERMS OF TRADE

When measured in physical quantity rather than in the current yen, the trend of the Japanese foreign trade appears in a quite different light. Although both exports and imports increased in total yen value by approximately 25 percent between 1929 and 1936 (see Table XXX),⁶ there was, as we have noticed, a substantial difference in the behavior of their prices. The average price of imports, as computed by the Yokohama Specie Bank and recomputed by the League of Nations on a new base year, 1929, rose approximately 2 percent, while the price of exports fell approximately 28 percent.⁷ Thus, in 1936 in order to secure a quantity of imports 22 percent greater than in 1929, Japanese exporters had to supply a quantity of exports 74 percent greater than in 1929 (see Table XXXV). The existence of this trend has been confirmed by Sir George Sansom.⁸ In this respect there was a greater deterioration in the foreign trade of Japan than in that of the other leading countries, in several of which, notably the United States, Germany, France, and Great Britain, the terms of trade, on the contrary, markedly improved.⁹

A number of factors contributed to the steady worsening in the terms of trade. Among them, the mounting resistance to Japanese textiles and other exports in foreign markets was of especial importance. At the beginning of the decade the general depression had caused governments throughout the world to try to improve the trade balances of their respective countries, on

⁶ Measured in terms of the gold value of the yen, the trade had depreciated by more than fifty percent in annual value, but since prices in terms of gold had also fallen this did not signify a commensurate reduction in quantity of goods traded.

⁷ Hubbard: *op. cit.*, p. 54.

⁸ Sansom: *Economic and Commercial Conditions . . . June, 1936*, p. 74.

⁹ See Clark: *op. cit.*, p. 456.

the one hand, by raising tariffs and setting up additional restrictions to the entry of foreign goods and, on the other, by variously promoting sales of their own goods abroad. The Smoot-Hawley tariff of 1930, the French imperial tariff of 1931, and the Ottawa system of imperial preferences instituted in 1932, were examples of the first. The devaluation of the yen in December 1931 provided a means of somewhat neutralizing this kind of

TABLE XXXV—JAPAN PROPER AND KARAFUTO: PERCENTAGE MOVEMENT OF FOREIGN TRADE

YEAR	EXPORTS								IMPORTS							
	QUANT- UM	PRICES				VALUE				QUANT- UM	PRICES				VALUE	
		YEN	GOLD	YEN	GOLD	YEN	GOLD	YEN	GOLD		YEN	GOLD	YEN	GOLD	YEN	GOLD
1929	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1930	88.3	77.5	82.8	68.4	73.2	87.8	79.5	85.5	69.8	75.0						
1931	91.0	58.6	62.2	53.4	56.6	97.3	57.3	60.9	55.8	59.3						
1932	107.6	61.0	35.3	65.6	38.0	96.2	67.2	41.7	64.6	40.1						
1933	119.0	72.8	31.6	86.6	37.6	99.8	86.7	38.1	86.5	38.0						
1934	140.6	71.9	27.5	101.1	38.7	106.4	96.8	37.3	103.0	39.7						
1935	159.6	72.9	26.9	116.3	42.9	111.6	100.1	37.1	111.4	41.4						
1936	174.2	71.9	26.7	125.3	46.6	122.4	101.9	38.1	124.7	46.6						

Figures for value refer to trade exclusive of reimports and reexports. Prices and quanta have been recomputed with 1929 as the base year from the series issued by the Yokohama Specie Bank in which 1928 was the base. A similar series issued by the Institute of Economic Research, Kobe University of Commerce, was used in the recomputation.

Source: League of Nations: *Review of World Trade, 1936*, p. 42.

barrier, and for several years Japanese goods made substantial progress in foreign markets in spite of the general restrictions. In the years 1934 and 1935, however, a succession of measures directed expressly against Japanese goods was adopted in the countries with which Japan normally traded. These took the form of import quotas and tariff increases, either separately or in conjunction, applied to cotton, silk, and rayon tissues, knit goods, rubber boots and shoes, china and earthenware, paper, toys, and canned foodstuffs. In some instances, exchange depreciation duties or dumping duties on imports at very low prices were imposed.¹⁰ Moreover, in addition to restrictions officially put into effect, still others were threatened and only warded off by the adoption on the part of Japanese exporters of self-imposed

¹⁰ For detailed list, see Uyeda: *Recent Development . . .*, pp. 74-80.

limitations.¹¹ The result of all these measures was a very considerable reduction in the volume of Japanese exports to the countries concerned. It is not surprising, therefore, that Japanese exporters, forced to turn from the markets where the advantages of geographical proximity or high purchasing power were strongest to others farther afield or poorer, should then find their profits reduced by high costs of transportation or by the lowering of prices to bring their goods within the range of new classes of customers.

A second factor in the worsening of the terms of Japanese foreign trade in these years lay in the nature of the trade with the "yen bloc." It has already been noticed that an important element in the expansion of the export trade of Japan during the thirties was a greatly increased flow of goods first to Manchuria and Kwantung, and after 1937 to the occupied part of China proper. All this controlled territory was designated a single currency bloc to facilitate financial transactions and trade. It was thus possible for the Japanese government and private interests to extend credit to producers and administrators in the controlled territory without directly affecting the foreign exchange value of the yen. Such credit was liberally extended for the purpose of developing the local resources, especially the mineral resources, and establishing there a heavy industry and a source of semi-manufactured materials for the heavy industry of Japan. The equipment of the new enterprises was provided from Japanese and Korean sources almost exclusively. The growth of exports from Japan to the controlled territory, therefore, represents in large part the first outlay in what was intended to be a long-term investment. A compensating return in goods was not to be immediately expected, nor was it forthcoming. The imports received in Japan from these territories were much less in value than the exports sent there and were of comparatively small help in supplying the lack of critical raw materials in Japan. Thus, the fact that in the controlled territory there was, at least temporarily, a market for Japanese exports protected by Japanese credit, served rather as a drain upon the home resources than as a means of improving the country's bargaining position in foreign trade with the rest of the world.

The profitableness of the foreign trade was adversely affected by the decision taken in the early thirties to develop the heavy industries of Japan proper at any cost. To some extent the adverse effect was due to the diver-

¹¹ This was done by exporters of canned and frozen tuna fish, pottery, and matches to the United States; the exporters' association in each industry assumed the responsibility of enforcing the restrictions.

sion of part of the economic energy of the country from the manufacture of such products as textiles and miscellaneous light articles, for which the natural advantages of Japan were comparatively good, to the production of metal manufactures where the handicaps were more noticeable than the advantages and the costs of production therefore were higher. It was due even more, however, to the fact that the expansion of the heavy industry entailed the purchase in world markets of many expensive materials for which some means of payment must be found. Purchases of ores and metals on a steadily mounting scale had to be paid for mainly by larger sales of textiles and light manufactures.

There was thus great pressure to increase exports at a time when the Japanese government was not in a position to facilitate their sale in several of the usual ways. For instance, the fact that Japanese purchases of raw materials had often to be made in countries where few Japanese goods were sold rendered negotiation of reciprocal trade agreements by the Japanese government difficult, and frequently impossible, in a period when these were a favorite means of relief from excessively high tariffs.¹² Moreover, the need of large purchases abroad soon made the drawbacks of an erratic currency keenly felt, and a stabilization of the yen was effected by linking it first to the pound at the rate of 1s. 2d. and in October 1939 to the dollar at $23\frac{7}{16}$ cents.¹³ This deprived the export trade of the stimulus it had received from the devaluation of the yen.

Again, the incidence of recovery from the trade depression in world markets worked increasingly against the profitability of Japanese foreign trade between 1931 and 1937. The recovery in prices was first and greatest in primary materials of which Japanese purchases were heavy, and less rapid or complete in manufactured goods of which Japanese sales were important. Rearmament pushed up the prices of primary metals and semi-manufactured metal materials in particular.

After 1937 the influence of non-economic forces had an important ad-

¹² Professor Uyeda has pointed out that "Japan's exports exceed imports in her relations with 31 countries, while Japan's imports exceed exports as against only 15 countries." *loc. cit.*, p. 79.

In 1936 a bilateral trade agreement had been concluded with British India, and ones with Canada and the Netherlands Indies were achieved with difficulty. Unsuccessful conferences with representatives of the British Colonial Empire, Australia, and Egypt were held during the course of the three years from 1934 through 1936. A triangular agreement was reached by Germany, Manchukuo, and Japan. The only agreements reached with the United States were informal ones relating to the import of specific commodities, such as cotton rugs, pencils, and cotton cloth, into the United States and to the import of cotton cloth into the Philippines.

¹³ U. S. Dept. of Commerce: *International Reference Series*, June 1941, p. 7.

verse effect upon the terms of trade. Boycotts and moral embargoes, inspired by the foreign policy of Japan, reduced the purchases of Japanese goods far more effectively than they prevented the sale of war materials to Japan. It was only the adoption of export licenses and legal embargoes after the beginning of the war in Europe in 1939 that effectively cut off such supplies.

THE BALANCE OF PAYMENTS

In the invisible trade, the situation was more favorable.¹⁴ Payments for services rendered to foreigners in shipping and other transport, tourists' spending, and immigrants' remittances were most useful to the Japanese in providing foreign exchange. Although it is not possible to establish the details of the balance sheet from the incomplete data vouchsafed, it appears that after 1931 the excess of receipts over expenditures for service items was large enough to provide a surplus on the export side of the combined account of visible and invisible foreign trade of the Japanese Empire.¹⁵ This surplus may be regarded as net income from current operations available for investment abroad.

¹⁴ The invisible trade consists in services rendered by Japanese to foreigners, and vice versa, for which payment must be made through a transfer of funds from one currency to another.

¹⁵ Data for compiling these items and constructing the balance of payments for Japan proper have not been made public. Instead, a table of items governing the foreign account of the Japanese Empire as a whole was issued annually by the government through 1936. The statement for that year indicated a small deficit in the merchandise trade but a surplus in the service items, which produced a net export surplus of 129 million yen. Since no gold shipments occurred between 1933 and 1937, a net import of securities (export of capital) to the value of 129 million yen in 1936 would be presumed if these quantities were accurate. In a parallel statement of capital movements in 1936, the items were divided into long term operations, which showed a net outward movement of capital of 226.6 million yen, and short term operations, which showed a net inward movement of capital of 51.7 million yen. There was thus a net outward movement of all capital items of 174.9 million yen. When compared with the export of capital implied in the merchandise, service, and gold account, this is seen to be larger by 45.7 million yen, a difference explained as due to errors and omissions. The definitions of the items listed are by no means clear, and there are a number of blanks.

An independent estimate made by the League of Nations Economic Intelligence Service may be compared with the official Japanese one. It recorded a deficit in the merchandise trade and a surplus in the invisible trade, resulting in a net export surplus of 130.8 million yen in the combined account. The capital account showed a net export of long term capital of 226.8 million yen and a net export of short term capital of 42.4 million yen, making a total capital export of 269.2 million yen. The balance due to errors and omissions was thus 138.4 million yen.

The degree of error in these estimates is evidently high, and in the estimate of short term capital movements, there is a contradiction between the two versions. Other differences have been indicated, and it is doubtful whether any close approximation can be made.

The data of the balance of payments are taken from Japan, Finance Department, *Economic and Financial Annual 1937*, pp. 171-173, and League of Nations: *Statistical Yearbook 1937/1938*, pp. 208-211. See also Sansom: *Economic Conditions . . . 1936*, pp. 11, 12, and Allen: *Japanese . . . Condition*, p. 95.

The reports of Japanese foreign investment, as given annually in a parallel statement of capital account, show that from 1928 through 1936 Japanese investments abroad exceeded Japanese borrowings from abroad. Except in 1931, the difference between them, or the net outward movement of capital, considerably exceeded the margin shown as available for investment in the visible and invisible trade account. This persistent trend in the "errors and omissions" would seem to indicate that Japanese investments abroad were being made beyond the limit of net earnings in those years.

We are not given much information about these investments, but the following were apparently the most important: (1) net expenditure by the Japanese government in Manchuria, i.e., sums spent over and above those that found their way into Japanese hands in the home country through payment for goods, remittances to families, etc.; (2) private investment by Japanese, especially in industrial and commercial enterprises, in Manchuria and also in China proper, the Philippines, Australia, Brazil, and elsewhere; (3) the repurchase from foreigners of Japanese securities, real estate, and other property. However great the strategic value or ultimate profitability of these investments, most of them were weak in earning power from the immediate financial point of view.

The situation changed for the worse in 1937. During the first seven months of that year purchases of imported goods reached such proportions as to necessitate an outward shipment of gold to the value of 379.6 million yen.¹⁶ Subsequent gold movements have not been officially reported, but it has been estimated that "during 1937 about 830 million yen of gold was exported from Japan to balance her accounts."¹⁷ Shipments were similarly heavy in 1938 and 1939. At the same time, Japanese commitments on the Asiatic continent called for more and more funds.

CONCLUSION

To revert to the question we set out to answer, it is obvious that within the decade of the thirties, the problem of providing a stable or rising standard of living for the expanding Japanese population by means of industrial activity was not solved. During that time the standard of living fell, even from the depressed level of 1931. The decline was fairly gradual until 1936; it has been estimated that the average real wage of factory workers fell about ten percent between October 1931 and March 1936, as wages in money

¹⁶ Japan, Finance Department: *Economic and Financial Annual 1938*, p. 151.

¹⁷ Allen: Japanese . . . Condition, p. 104.

remained practically stationary while the cost of living rose.¹⁸ The skilled workers in heavy industry fared better than the rest of the labor group, and the textile workers, of whom the majority were women, fared considerably worse than the average. The plight of those employed in small workshops outside the scope of the factory acts and the home workers associated with them was even more acute, for the worsening in the terms of the export trade bore particularly heavily on the marginal producers.

Was the failure due to inability to answer the question, "What goods can Japan put these people to manufacturing (and manufacturing at prices set by fierce international competition) which foreign markets will buy?" That inability was surely, to some extent, the cause; but how much of the economic deterioration was due to the simultaneous prosecution of the program of territorial expansion we cannot finally say. It may be observed, however, that the crucial phrase, "which foreign markets will buy," appears, in the light of our analysis, to require some further qualification. It would seem more accurately to be a question of what rival producers will allow the mass of consumers in foreign markets to buy rather than a question of willingness on the part of the ultimate purchasers themselves. The experience of the early thirties revealed an avid demand for cheap Japanese textiles and light manufactures on the part of the low-income groups of Asia, Africa, and even Europe and America. The problem seems to be one of equalizing costs among rival producers by the elimination alike of exploitation and of inefficient production methods, and then of agreement upon a fair division of the field. Prediction of the future is hazardous, but if one may postulate a rational world after the war within which purchasing power is more equitably distributed than heretofore among the peoples of the earth, it is reasonable to hope that the energy, skill, and resourcefulness of the Japanese people may be used for ends profitable both to themselves and to the rest of us.

¹⁸ Uyeda and Inokuchi: Cost of Living . . . 1914-1936, pp. 20, 21. See also International Labor Office: *Yearbook of Labor Statistics 1941*, p. 100. It has been pointed out that during this time there was "a steady rise in industrial and trading profits among the larger Japanese firms." Hubbard: *op. cit.*, p. 54.

TERRITORIAL EXPANSION

From the moment when population pressure first became acute in Japan, there were military men, speculative entrepreneurs, and assorted political opportunists to argue, in season and out, that new territory alone could solve the problem. The demand for territorial aggrandizement, a recurrent motif in Japanese history, has been very much alive in the modern period, but its supporters have not always been in control. During the decade following the signing of the Treaty of Versailles, liberal leaders pursued a conciliatory foreign policy the greater part of the time.¹ Democratic institutions in Japan were still rather spindly, however, and too weak to withstand the campaign of terror and guile by which the militarist forces attacked them in 1931. Since then, the program of territorial expansion has been pressed forward ruthlessly, destroying the elements of freedom both among the subjugated peoples and among the Japanese people for whose alleged benefit the war is waged.

The record of Japanese territorial expansion may be summarized in four parts. (1) During some two thousand years of Japanese history, the main islands of Japan proper were won from the aboriginal Ainu, successfully defended against any subsequent invasion from the continent of Asia, and united in a single political unit, recognizing the supremacy of the Emperor.² At the beginning of the seventeenth century, when the spirit of exploration and conquest was dominant in the West, the Tokugawa line of *shoguns* (regents) imposed a seclusion upon Japan that lasted for two hundred and fifty years. During that time, the Japanese, so far from attempting conquests abroad, were forbidden to leave the country on pain of death or even to build a ship of more than fifty tons. (2) The intrusion of

¹ The premiership of General Tanaka from 1927 to 1929 provided a reactionary interval.

² It is generally believed that Japan proper was colonized by immigrants, many of Malayan stock, who came from the continent by way of the Korean peninsula and landed in the southern part of the islands about the beginning of the Christian era. They gradually pushed the original inhabitants northward and achieved a discordant unity of rival clans under an Emperor resident in Kyoto. Their first cultural relations were with China. The seventh and eighth centuries are known in Japanese history as the Period of the Imitation of China and Things Chinese (see Kuno: Japanese Expansion on the Asiatic Continent, Vol. I, p. 28). Although tribute was paid by Japan to China and at other times by China to Japan, neither succeeded in invading the other country. The most notable efforts were the thirteenth century expeditions of Kublai Khan, whose armadas were brought to grief in the Tsushima Straits before reaching the home waters of Japan, and Hideyoshi's expedition to the mainland which succeeded in subduing Korea for a few years in the late sixteenth century. The wars between China and Japan were fought chiefly on the Korean peninsula for the right to dominate the kingdoms there. The depredations of Japanese, Korean, and Chinese pirates ranged as far as the South Sea islands, and there are records of Japanese settlers in Siam, Cambodia, and Java in the sixteenth century. See Timperley: Japan . . . pp. 31-41.

Commodore Perry and his men-of-war in 1853 and the ensuing establishment of diplomatic relations, brought Japan into contact with the outside world at a time when the Great Powers of Europe were engaged in a scramble for concessions in China, the ultimate prize being the lion's share of the Chinese trade.³ The role of force in the victories of European diplomacy in China was not lost upon Japanese observers, who saw in the superiority of Western science the explanation of the helplessness of their strongest neighbor. The resolution to escape a similar fate and, if possible, to take part in the struggle for Chinese prizes led them to adopt Western methods eagerly. It was nearly a generation, however, before Japanese forces were ready for a trial of strength on the mainland. As a result of the Sino-Japanese War of 1894-1895, the Russo-Japanese War of 1904-1905, the First World War of 1914-1918, and intervention in Siberia from 1918 to 1922, Japan had made notable additions to the territory of the Empire by 1931. These included a screen of island outposts in the Pacific on three sides of Japan proper and on the fourth, the landward, side the adjacent Korean peninsula and a foothold of leased territory beyond in Manchuria.⁴ Although valuable from the strategic point of view, these acquisitions did not add greatly to the economic endowment of the Empire nor offer much unoccupied land suitable for settlement.

(3) During a ten-year period of undeclared war against the Chinese

³ See Hudson: *The Far East in World Politics*.

⁴ The Pacific islands were obtained from China, Russia, Great Britain, and Germany. The Lyuchyu Islands, dependencies of China, were yielded to Japan in a treaty with China signed in 1874, and their incorporation was completed in 1879. Formosa and the Pescadores were ceded by China in the Treaty of Shimonoseki in 1895. The Bonin Islands which had been vaguely claimed by Britain were relinquished to Japan in 1876 and incorporated in the Japanese Empire. In 1914 the islands in the South Pacific held by Germany were seized by Japanese forces, and Japan was given a mandate over them by the terms of the Treaty of Versailles, with the provision that they were not to be fortified. The southern Kurile Islands had been obtained from Russia in 1875 in consideration of the abandonment by Japan of a claim to the southern half of the island of Sakhalin. The latter was seized in the Russo-Japanese War, and the section south of the 50th parallel was allotted to Japan by the terms of the Portsmouth Treaty. The northern part of the island was occupied by the Japanese forces in the period of intervention from 1918 to 1925, and a treaty signed in 1925 granted Japan concessions for the production of petroleum in the Russian section.

The gains on the mainland were obtained from China, Russia, and the nominally independent state of Korea. In 1905 the Treaty of Portsmouth transferred Russian rights over Port Arthur, the Kwantung Leased Territory, and the South Manchurian Railway to Japan, and the existence of a Japanese protectorate over Korea was recognized. In 1910 Korea was formally annexed. Japanese claims of further rights in Manchuria to enforce the security of the railway zone were among the notorious Twenty-One Demands presented to China in 1915 but were not included in the Versailles Treaty. The former German holdings in Shantung Province of China, seized by Japan in November 1914, were awarded to Japan over Chinese protests by the terms of the Treaty of Versailles, but were peacefully returned to Chinese sovereignty in 1922.

Republic, between September 18, 1931, and December 7, 1941, Japanese control was extended still farther over islands in the Pacific,⁵ and the holdings of continental territory were enormously increased. By the latter date, Japanese forces had seized Manchuria, Jehol, Inner Mongolia, the principal cities and railways in the northern and eastern provinces of China proper, and the principal ports along the Chinese seaboard, and they had put into effect a *de facto* military occupation of Indo-China in July, 1941, after having concluded a peace agreement with the Vichy government in May. (4) Between December 7, 1941, and May 1942, war with China, the United States, the British Empire, and the Netherlands spread Japanese control southward over most of the chief islands in the South Pacific and on the mainland southward from the border of China to the Indian Ocean and westward to the borders of India.⁶ Free China was forced to depend for supplies upon air freight and the overland routes from Russia, and the Allies were left with no adequate naval base nearer to Japan than Australia.

The method of administering the territories has differed in form in the outer Empire, the puppet states, and the newest conquests, but the underlying principle has been the same: the exploitation of the economic resources of the country for the benefit of Japan and under Japanese auspices. In the Empire this was accomplished with the help of a common currency, a customs union, and government support of Japanese investment.⁷ In the puppet states set up in Manchuria and at Nanking the Japanese "advisers" have seen to it that similar ends are kept in view in the laws relating to currency, taxation, and trade regulations. Government-sponsored holding companies have been floated to commandeer industrial property and enforce its operation according to the master plan.⁸ Looting and smuggling have been winked at. Less is known of the procedure in the more recently conquered states, but it may be surmised that the amenities are none too scrupulously observed.

⁵ The departure of Japan from the League of Nations in 1931 removed the legal barrier to fortifying the mandated islands in the South Pacific. In the spring of 1939, Japan annexed the island of Hainan from China and the Spratly group, dependencies of Indo-China.

⁶ Japanese military forces had succeeded in occupying the strategic points in the following islands or island groups in the Pacific: Guam, Wake, the Philippines, the Netherlands Indies, Sarawak, British Borneo, most of New Guinea, the Solomons, and the Bismarck Archipelago. In addition, they had occupied Hong Kong, Thailand, Malaya, and Burma, together with the Andaman Islands.

⁷ In 1936 the value of the merchandise trade of Korea with Japan proper and other parts of the Empire amounted to 86 per cent of the total foreign trade (1,166.0 as against 188.1 million yen); in Formosa the imperial share was 89 per cent (602.7 as against 77.9 million yen). See Japan, Finance Department: *Economic and Financial Annual 1937*, pp. 248, 274, 275.

⁸ See J. E. Orchard: Japan's Economic Invasion of China, pp. 471-476, and D. J. Orchard: Manchuria . . . pp. 36-39.

The economic program envisaged for the "Greater East Asia Co-Prosperity Sphere" may be deduced from the plans announced for its charter members.⁹ Japan is to be the imperial center, setting the course and drawing dividends from the farthest corner of the "sphere." The "highest type of precision industry" is to be the industrial speciality of the metropolitan country, but mining, heavy industry, chemical and electric enterprises may be developed in Manchuria and textiles and light manufactures in China proper. The production of food and of agricultural raw materials, such as raw cotton, is to be extended to the limit of the potentialities of the member countries and the use of non-renewable resources carefully regulated. The intention is to make the sphere independent, so far as possible, not only of Western importers but of Western investors, also.

The political implications of such a program are plain. Although they involve the elimination of the property rights and influence of Occidentals to the utmost possible extent, some foreign relations would be unavoidable. The Japanese government, acting for the region as a whole, may make alliances with the Fascist powers and arrive at a *modus vivendi* with a neutral power, when necessary. Within the sphere, political opposition must be rooted out, whether it be in the form of liberalism in Japan or nationalism of any tinge in the tributary members.

The government of the United States had no choice but to deal with a Japanese government embarked on such a course. The economic interests of this country in the Far East were weighty,¹⁰ the preservation of the sovereignty of the Philippines was a claim upon the national honor, and the fundamental foreign policy of the United States was clearly challenged. That policy has been to support the principles of orderly change, equality of treatment in trade, respect for territorial integrity, non-intervention in domestic affairs, and the international reduction of armament.¹¹ Foreign

⁹ The following description is based upon the statements in the "Program for Economic Construction Embracing Japan, Manchoukuo and China" published by the Cabinet Information Bureau, Tokyo, in November 1940, and summarized in Quigley: *Far Eastern War* . . . pp. 125, 126.

¹⁰ In 1939 the total foreign trade of the United States was valued at 5,495.3 million dollars, of which the trade with Eastern, Southeastern, and Southern Asia (excluding Oceania) accounted for 1,197.0 million dollars. In 1936, the total had been 4,878.6 and the equivalent share, 1,065.9 million dollars. See United States, Department of Commerce: *Statistical Abstract of the United States 1941*, pp. 548, 549.

Moreover, this trade provided the United States with imports of high strategic value. Professor Hall, writing in 1940, summarized the situation: "Under present conditions Southeastern Asia supplies the bulk, if not all, of five first-priority materials: manila fiber (100 per cent), quinine (99 per cent), rubber (98 per cent), silk (98 per cent), and tin (93 per cent). It also supplies the bulk of two second-priority materials: tungsten (92 per cent) and mica (61 per cent of preferred grade)." Hall, *American Raw-Material Deficiencies* . . . p. 185.

¹¹ See the statement of the Secretary of State, quoted in Hornbeck: *The United States and the Far East* . . . p. 6.

relations have been affected also by the high protective tariff upon many imports entering the United States¹² and by immigration laws that bar both Chinese and Japanese.

The principles governing American foreign policy were embodied in the Naval Treaties of 1922 and 1930, the Nine-Power Treaty of 1922, and the Pact of Paris of 1929,¹³ but maintaining their effectiveness soon proved difficult. The United States associated itself with the League of Nations in condemning Japanese aggression in Manchuria in 1931 as a violation of the Nine-Power Treaty and the Pact of Paris as well as of the League Covenant. It acted in similar coöperation in 1937. After notice by Japan of the proposed abrogation of the Naval Treaty of 1930 in 1934, common action by the United States and Japan became almost impossible, and mutual relations grew increasingly strained. Protests, warnings, and forbearance in exacting compensation from Japan for injury to American rights in the Far East proved ineffectual. The denunciation by the United States of the Japanese trade treaty on July 26, 1939, to take effect six months later, permitted the employment thereafter by the State Department of trade restrictions as a means of political pressure.¹⁴ These were applied with a stringency that reached a climax in the freezing of all Japanese credits in the United States in July 1941.¹⁵ The government of the United States had meanwhile been extending to the legitimate government of China credits that amounted to 197 million dollars between 1931 and the end of 1941,¹⁶ and Lend-Lease aid was made available early in 1941. An understanding with Great Britain as to joint naval action in the event of hostilities in the Pacific was prepared.

The motives of the territorial expansionists as stated by themselves do not admit of rational analysis. It is difficult, for instance, to see how the professed need of Japan for access to raw materials and for relief from population pressure can be met simultaneously with the bringing of new prosperity to the conquered peoples. The plans calling for heavy investment of capital in the sphere and the announced intention of minimizing contact

¹² No reciprocal trade agreement for the reduction of the standard rates of duty has been entered into with a Far Eastern country.

¹³ Hornbeck: *op. cit.*, pp. 11-57.

¹⁴ Diebold: *New Directions in Our Trade Policy*, pp. 119-121.

¹⁵ At the time of the freezing, Japanese assets in the United States were valued at 138 million dollars and American assets in Japan at 110 million dollars. Less than ten years earlier, in 1932, Japanese assets in the United States had totalled 1,700 million dollars. See Quigley: *op. cit.*, p. 204.

¹⁶ Information supplied by the Far Eastern Unit, Bureau of Foreign and Domestic Commerce, and quoted in Quigley: *op. cit.*, p. 205.

with the West,¹⁷ where funds for investment and capital goods are most plentiful, appear to face in opposite directions. Nor does the assumption by Japan of the role of an apostle of the cultural unity of the Asiatic peoples¹⁸ seem to agree with the Japanese practice of discrimination against the natives of long conquered lands like Korea or to take account of the heterogeneity of religion, race, and mode of life among the multitudinous residents of "East Asia." The exclusiveness and extravagant claims of the Shinto religion alone would be a formidable stumbling block to unity. We can only conclude that the swelling grandiosity of the titles of the territorial expansionists indicate symptoms of megalomania rather than a sober statement of their case.¹⁹

Foreign observers' interpretations of the motives of the territorial expansionists cover much ground. Some stress the element of religious fanaticism that belief in the divine origin of the Japanese race and worship of the Emperor give to their conviction of Manifest Destiny.²⁰ Others lay much of the trouble to a deep-seated feeling of personal insecurity acquired by the Japanese in early life.²¹ Some point out the fact that the ancient strength of the militarist tradition was reinforced at the moment of emergence from feudal conditions by the intensive tutelage of Prussian instructors.²² Sensitiveness to racial discrimination by "white races" and a keen feeling of inferiority at any failure to grant Japan the full status of a Great Power have been enlarged upon as important causes of resentment.²³ Other analysts see the issue primarily as the struggle for power among sovereign

¹⁷ See Hishida: *Japan among the Great Powers*, p. 387.

¹⁸ See Kawai: *The Goal of Japanese Expansion*, p. 92.

¹⁹ The stages have been described by Mr. Hornbeck (*op. cit.*, pp. 44, 45):

There was common knowledge of certain changes that had appeared in the phraseology employed in Japanese official utterances on foreign policy in the course of the preceding three years. When Japan sent troops to North China in July 1937, Prime Minister Konoye had stated that this action was taken only "to preserve the peace of east Asia." On November 3, 1938—while Prince Konoye was still Prime Minister—the Japanese Government had issued a formal statement in which it announced that Japan was seeking the establishment of "a new order" based upon "coöordination between Japan, Manchukuo, and China in political, economic, cultural and other fields." On August 1, 1940, Prince Konoye, who had again become Prime Minister, had stated that Japan sought the construction of "a new order for Greater East Asia." Later, Prince Konoye's Minister for Foreign Affairs had stated to Ambassador Grew that it was the intention of Japan to create a "new order in Greater East Asia, including the South Seas." And soon after the announcement of the alliance, Prince Konoye referred, on October 4, 1940, to the aim of the alliance with Germany and Italy as joint coöperation to establish "a new world order."

²⁰ Timperley: *op. cit.*, pp. 62-66.

²¹ Embree: *The Japanese*.

²² Moore: *With Japan's Leaders*.

²³ Hudson: *The Far East in World Politics*, pp. 181-182.

states, each desirous of regional political supremacy.²⁴ Still others demonstrate the force of the economic motive that would lead Japan to prevent the independent unification of China lest the superiority of Chinese resources in manpower and raw materials reduce Japan to the position of a minor industrial competitor.²⁵ Finally, it has been shown that the seething social unrest in Japan in 1931 and the apparently irreconcilable dilemma it presented to the leaders made the distraction of foreign campaigns seem to them the only way of escape.²⁶

The form of government in Japan, which gives ranking officers of the army and navy on active duty the power of initiative and veto in the counsels of state while allowing the mass of the people no responsible representative, favored the ascendancy of the militarists from the first moment of crisis,²⁷ and the trend toward a more nearly complete military dictatorship developed rapidly after 1940.²⁸ It will be evident even from this brief outline that the majority of the Japanese people have suffered much. It has been said of them that "lacking in political experience and deprived of liberal leadership by a vigilant police, they tread submissively the traditional path of loyalty. While it may not be anticipated that they will revolt, it is important to realize that the Japanese policy of aggrandizement is not a people's movement. There is greater community of interest between the Japanese and Chinese peoples than either of them realize . . . The Japanese people will not forsake their Emperor. But they may arrive at a new conception of the requirements of loyalty."²⁹

²⁴ Spykman: *America's Strategy in World Politics*, pp. 129-164.

²⁵ Hudson and Rajchman: *An Atlas of Far Eastern Affairs*, pp. 71, 72, 124, 132.

²⁶ Hubbard: *Eastern Industrialization* . . . p. 103.

²⁷ The Japanese constitution of 1889, although outwardly democratic in many of its institutions, is far from being so in actual operation. It is based upon the supreme power of the Emperor, who is hedged about with groups of advisors representing the aristocracy, the bureaucracy, and the armed forces. The lower house of the Diet is the only directly elected body; it has very limited prerogatives and is prevented from effective use even of these by the lack of a coherent system of political parties.

See Reischauer: *Japan: Government-Politics* and Colegrove: *The Japanese Cabinet*. A detailed account of the struggle between the representatives of civil and of military power during the critical years is found in Young: *Imperial Japan 1926-1938*.

²⁸ See Quigley: *op. cit.*, pp. 149-165; Fahs: *Government in Japan* . . . and Borton: *Japan since 1931* . . .

²⁹ Quigley: *op. cit.*, pp. 281-282.

LIST OF REFERENCES

This list includes only works to which reference has been made in the preceding part of this book. A brief note on maps will be found on page 98.

- ALLEN, G. C. Japanese Industry: Its Organization and Development to 1937, in *The Industrialization of Japan and Manchukuo 1930-1940 . . .* E. B. Schumpeter, ed. New York, 1940.
- _____. Japanese Industry: Its Recent Development and Present Condition. New York, 1940.
- BAIN, H. FOSTER. Ores and Industry in the Far East . . . With a chapter on Petroleum by W. B. HEROY. Revised and enlarged edition, New York, 1933.
- BORTON, HUGH. Japan since 1931: Its Political and Social Development. New York, 1940.
- BRADLEY, JOHN R., and DONALD W. SMITH. Fuel and Power in Japan. *Trade Inf. Bull.*, No. 821, U.S. Bureau of Foreign and Domestic Commerce. Washington, 1935.
- China, Geological Survey. *Memoirs*, Ser. A, No. 2. See TEGENGREN, F. R.
- _____. *Special Reports*, No. 1. See TING, V. K., and W. H. WONG
- _____. *Special Reports*, No. 4. See HOU, T. F.
- _____. *Special Reports*, No. 5. See HOU, T. F.
- China Year Book 1931-1932*. H. G. W. Woodhead, ed. Shanghai, 1932.
- CLARK, COLIN. The Conditions of Economic Progress. London, 1940.
- COLEGROVE, KENNETH. The Japanese Cabinet. *Am. Pol. St. Rev.*, Madison, Vol. XXX, October 1936.
- Contemporary Japan*. Tokyo, Vol. X, May 1941. Anonymous extract, "Our Future Population Problem," from the *Toyo Keizai*, April 26, 1941.
- Contemporary Opinions on Current Topics*, Tokyo, No. 369, February 20, 1941. Reprinted editorial, "Government Decides on Plans to Increase Japan's Population" by Yuzo Hara, from the *Diamond*, February 11, 1941.
- CROCKER, W. R. The Japanese Population Problem: The Coming Crisis. New York, 1931.
- DAVIS, DARRELL H. Present Status of Settlement in Hokkaido. *Geogr. Rev.*, New York, Vol. XXIV, July 1934.
- DIEBOLD, WILLIAM, JR. New Directions in Our Trade Policy. *Studies in American Foreign Relations*, No. 21. New York, 1941.
- EHLERS, J. H. Raw Materials Entering into the Japanese Iron and Steel Industry. *Trade Inf. Bull.*, No. 573, U.S. Bureau of Foreign and Domestic Commerce. Washington, 1928.
- EMBREE, J. F. The Japanese. *Smithsonian Institution War Background Studies*, No. 7. Washington, 1943.
- FAHS, CHARLES B. Government in Japan: Recent Trends in Its Scope and Operation. New York, 1940.
- Far East Year Book 1941*. Far East Yearbook, Inc. (Division of the Asia Statistics Co.), Tokyo, 1941.
- FONG, H. D. The Post-War Industrialization of China. *National Planning Association Planning Pamphlets*, Nos. 12 and 13. Washington, 1942.

- FRECHTLING, LOUIS E. Japan's Oil Supplies. *Amerasia*, New York, Vol. V, July 1941.
- FUKUI, E. Climatic Division of Japan. *Geogr. Rev. of Japan*, Tokyo, Vol. IX, 1933. (In Japanese with English résumé, pp. 294-300).
- FURUTA, KEIZO. Coal Demand and Supply and Control of the Coal Industry in Japan. *Trans. World Power Conf., Washington, 1936*, Vol. II, Paper No. 1, Section 1. Washington, 1938.
- GORDON, MARGARET S. Japan's Balance of International Payments 1904-1931, in Industrialization of Japan and Manchukuo 1930-1940 . . . E. B. Schumpeter, ed. New York 1940.
- GRAJDANZEV, ANDREW J., compiler. Statistics of Japanese Agriculture with Introductory Notes. New York, 1941. Mimeo., Institute of Pacific Relations.
- HALL, ROBERT BURNETT. American Raw-Material Deficiencies and Regional Dependence. *Geogr. Rev.*, New York, Vol. XXX, April 1940.
- and AKIRA WATANABE. Landforms of Japan. *Papers Michigan Acad. Science, Arts, and Letters*, Ann Arbor, Vol. XVIII, 1932.
- HAUSHOFER, KARL. Japan und die Japaner: eine Landes- und Volkskunde. Leipzig-Berlin, 1933.
- HEROY, W. B. See H. FOSTER BAIN.
- HISHIDA, SEIJI GEORGE. Japan Among the Great Powers. Toronto, 1940.
- HORNBECK, STANLEY K. The United States and the Far East: Certain Fundamentals of Policy. Boston, 1942.
- HOU, T. F. General Statement on the Mining Industry (Fourth Issue, 1929-1931). *Geol. Surv. of China, Special Reports*, No. 4. Peiping, 1932.
- . General Statement on the Mining Industry (Fifth Issue, 1932-1934). *Geol. Surv. of China, Special Reports*, No. 5. Peiping, 1935.
- HUBBARD, G. E. Eastern Industrialization and Its Effect on the West. With a conclusion by T. E. Gregory. 2nd edition, revised and enlarged, London, 1938.
- HUDSON, G. F. The Far East in World Politics. New York, 1937.
- and MARTHE RAJCHMAN. An Atlas of Far Eastern Politics. Enlarged edition, New York, 1942.
- Imperial Institute (Great Britain). The Mineral Industry of the British Empire and Foreign Countries: Statistical Summary (Production, Imports, and Exports) 1933-1935. London, 1936.
- . The Mineral Industry . . . Statistical Summary . . . 1936-1938. London, 1939.
- INOKUCHI, TOSUKE. See TEIJIRO UYEDA
- INOUE, KINOSUKE. The Iron Ore Supply of Japan, in International Geol. Congress: Iron Ore Resources . . . Vol. II. Stockholm [1910].
- . The Iron Ore of Corea, in International Geol. Congress: Iron Ore Resources . . . Vol. II. Stockholm [1910].
- International Geological Congress. The Coal Resources of the World . . . 3 vols. and atlas. Edited by William McInnes et. al. of the Geological Survey of Canada. Toronto, 1913.
- . The Iron Ore Resources of the World . . . 2 vols. and atlas. Edited by the General Secretary of the Congress. Stockholm [1910].
- International Labor Office. *Yearbook of Labor Statistics 1941*. Montreal, 1942.

- ISHII, RYOICHI. Population Pressure and Economic Life in Japan. London, 1937.
- Japan, Bureau de la Statistique Générale au Cabinet Imperial. *Résumé de l'Empire du Japon 1940*. Tokyo, 1940.
- Japan, Bureau of Mines. *Review of the Mining Industry in 1935*. Tokyo [1936]. (In Japanese with partial translation into English).
- Japan, Department of Finance. *Annual Return of the Foreign Trade 1929*. Tokyo, 1930.
- _____. *Annual Return of the Foreign Trade 1936*, Vol. I. Tokyo, 1937.
- _____. *Monthly Return of the Foreign Trade*, December 1939. Tokyo, 1940.
- _____. The Import Tariff of Japan 1934. Tokyo [1934].
- _____. *The . . . Financial and Economic Annual of Japan 1921*. Tokyo [1922].
- _____. *The . . . Financial and Economic Annual of Japan 1937*. Tokyo [1938].
- _____. *The . . . Financial and Economic Annual of Japan 1938*. Tokyo [1939].
- _____. *The . . . Financial and Economic Annual of Japan 1940*. Tokyo [1941].
- Japan, Imperial Geological Survey. *Annual Report (118) for the Year Ended March 31, 1936*. Tokyo, 1936.
- _____. The Geology and Mineral Resources of the Japanese Empire. Tokyo, 1926.
- Japan Yearbook 1926. Y. Takenobu, ed. Tokyo, 1926.
- Japan Yearbook 1931. Y. Takenobu, ed. Tokyo, 1931.
- Japan Times Yearbook 1933. 3rd edition, Tokyo, 1933.
- Japan Yearbook 1940-1941. The Foreign Affairs Association of Japan, Tokyo, 1940.
- JONES, W. D. Hokkaido, the Northland of Japan. *Geogr. Rev.*, New York, Vol. XI, January 1921.
- KAMII, YOSHIO. Industrial Transformation in Japan 1929-1936. *International Labor Rev.*, Geneva, Vol. XL, October 1939.
- KAWAI, TATSUO. The Goal of Japanese Expansion. Tokyo, 1938.
- KISHINDO, SABURO. Results of Oceanographical Studies of the "Kuroshio" (Japan Current) . . . *Proc. Third Pan-Pacific Science Conf.*, Vol. I. Tokyo, 1928.
- KRISS, GEORGE. Le problème de la population au Japon. With a preface by André Siegfried. Paris, 1936.
- KUHN, OLIN R. World's Iron-Ore Resources Now Exceed 57,000,000,000 Tons. *Engineering and Mining Journal-Press*, New York, Vol. CXXII, July 17, 1926.
- KUNO, YOSHI SABURO. Japanese Expansion on the Asiatic Continent . . . 2 vols. Berkeley, 1937-1940.
- League of Nations, Economic Intelligence Service. *Review of World Trade 1936*. Geneva, 1937.
- _____. *Statistical Yearbook of the League of Nations 1933/1934*. Geneva, 1934.
- _____. *Statistical Yearbook of the League of Nations 1937/1938*. Geneva, 1938.
- _____. *Statistical Yearbook of the League of Nations 1939/1940*. Geneva, 1940.
- LITTLE, ARCHIBALD. The Far East. Oxford, 1905.
- MCCUNE, SHANNON. Recent Growth of Japanese Cities. *Geogr. Rev.*, New York, Vol. XXXII, January 1942.
- MACRAE, H. A. See SIR G. B. SANSON
- MILLER, O. M. Notes on Cylindrical World Map Projections. *Geogr. Rev.*, New York, Vol. XXXII, July 1942.

- Mitsubishi Economic Research Bureau. Japanese Trade and Industry . . . Tokyo-London, 1936.
- . *Monthly Circular*. Tokyo, No. 163, May 1937; No. 182, December 1938; No. 201, July 1940; No. 205, November 1940.
- MOORE, FREDERICK. With Japan's Leaders. New York, 1942.
- NASU, SHIROSHI. Aspects of Japanese Agriculture: A Preliminary Survey. New York, 1941. Mimeo., Institute of Pacific Relations.
- OBAMA, TOSHIYE. Our Electric Industry. *Contemporary Japan*, Tokyo, Vol. IX, May 1940.
- OKADA, T. The Climate of Japan. *Bull. Central Meteorol. Observ. Japan*, Tokyo, Vol. IV, No. 2, 1931.
- ORCHARD, DOROTHY JOHNSON. Manchuria—A Pattern of the "New Order in East Asia." *Asia*, New York, Vol. XL, January 1940.
- . See also JOHN E. ORCHARD
- ORCHARD, JOHN E. Japan's Economic Invasion of China. *Foreign Affairs*, New York, Vol. XVIII, April 1940.
- . Japan's Economic Position: The Progress of Industrialization. With the collaboration of DOROTHY JOHNSON ORCHARD. New York, 1930.
- Oriental Economist*. Tokyo, Vol. III, December 1936.
- PELZER, KARL J. Japanese Migration and Colonization, in *Limits of Land Settlement*, Isaiah Bowman, ed. New York, 1937.
- . Population and Land Utilization (An Economic Survey of the Pacific Area, Part I). New York, 1941.
- PENROSE, E. F. Japan 1920-1936, in *The Industrialization of Japan and Manchukuo 1930-1940* . . . E. B. Schumpeter, ed. New York, 1940.
- QUIGLEY, HAROLD S. Far Eastern War 1937-1941. Boston, 1942.
- RAJCHMAN, MARTHE. See G. F. HUDSON
- REISCHAUER, ROBERT KARL. Japan: Government—Politics. New York, 1941.
- Royal Institute of International Affairs. Unsigned article, "Naval and Air Bases in the Pacific." *Bull. International News*, London, Vol. XVIII, March 22, 1941.
- . Raw Materials. *Inform. Dept. Papers*, No. 18A. London, November 1939.
- SANSOM, SIR G. B. Report on Economic and Commercial Conditions in Japan, June 1936, with Annexes on Economic Conditions in Korea, Formosa, and Japanese Mandated Territory. *Great Britain, Dept. of Overseas Trade Reports*, No. 653. London, 1936.
- and H. A. MACRAE. Economic Conditions in Japan 1933-1934 with Annexes on Economic Conditions in Formosa, Korea, and Japanese Mandated Territory. *Great Britain, Dept. of Overseas Trade Reports*, No. 604. London, 1935.
- SCHUMPETER, E. B. The Population of the Japanese Empire, in *The Industrialization of Japan and Manchukuo 1930-1940*, E. B. Schumpeter, ed. New York, 1940.
- SMITH, DONALD W. See JOHN R. BRADLEY
- SPYKMAN, N. J. America's Strategy in World Politics: The United States and the Balance of Power. New York, 1942.
- STAMP, L. DUDLEY. Asia: A Regional and Economic Geography. 3rd edition, revised. New York, 1936.
- TEGENGREN, F. R. The Iron Ores and Iron Industry of China. 2 vols. and atlas. *Geol. Surv. China, Memoirs*, Ser. A, No. 2, 1921-1923. Peking, 1924.

- TIMPERLEY, H. J. Japan: A World Problem. New York, 1942.
- TING, V. K., and W. H. WONG. General Statement on the Mining Industry. *Geol. Surv. China, Special Reports*, No. 1, June 1921. Peking, 1921.
- Toshai Mondai. Article summarizing the results of the 1940 census. Tokyo, Vol. XXXII, June 1941. (In Japanese).
- Toyo Keizai. Unsigned article, "Our Future Population Problem." Tokyo, April 26, 1941. (In Japanese). Condensed English translation in *Contemporary Japan*, Tokyo, Vol. X, June 1941.
- TREWARTHA, GLENN T. A Reconnaissance Geography of Japan. *Univ. Wisconsin Studies in the Social Sciences and History*, No. 22. Madison, 1934.
- . Notes on a Physiographic Diagram of Japan. *Geogr. Rev.*, Vol. XXIV, July 1934.
- United States, Bureau of the Census. *Statistical Abstract of the United States* 1941. Washington, 1942.
- United States, Bureau of Mines. *Foreign Minerals Quarterly*, Washington, Vol. I, April 1938; Vol. IV, October 1941.
- . *Minerals Yearbook 1937: Review of 1936*. Washington, 1937.
- . *Minerals Yearbook 1938: Review of 1937*. Washington, 1938.
- . *Minerals Yearbook 1940: Review of 1939*. Washington, 1940.
- United States, Federal Power Commission. *Twentieth Annual Report 1940*. Washington, 1941.
- United States, Department of Commerce. *Foreign Commerce Yearbook 1933*. Washington, 1934.
- . *Foreign Commerce Yearbook 1938*. Washington, 1939.
- . *Foreign Commerce Yearbook 1939*. Washington, 1942.
- . *International Reference Service*, Washington, Vol. I, June 1941.
- United States, Hydrographic Office. Great Circle Sailing Chart of the North Pacific Ocean. 37th ed., November 1935. H. O., No. 1282. Washington, January 1942.
- . Table of Distances between Ports via the Shortest Navigable Routes . . . H. O. No. 117. Washington, 1942.
- UYEDA, TEIJIRO. Recent Developments of Japanese Foreign Trade . . . *Japanese Council Papers*, No. 3, Institute of Pacific Relations. Tokyo, 1936.
- . The Growth of Population and Occupational Changes in Japan 1920-1935. *Japanese Council Papers*, No. 2, Institute of Pacific Relations. Tokyo, 1936.
- and TOSUKE INOKUCHI. The Cost of Living and Real Wages in Japan 1914-1936. *Japanese Council Papers*, No. 1, Institute of Pacific Relations. Tokyo, 1936.
- UYEHARA, SHIGERU. The Industry and Trade of Japan. London, 1926.
- WATANABE, AKIRA. On the Distribution of Volcanoes in Japan. *Papers Michigan Acad. Sciences, Arts, and Letters*, Ann Arbor, Vol. XIV, 1930.
- . See also ROBERT BURNETT HALL
- Wirtschaft und Statistik. Unsigned article, "Die japanische Mineralölwirtschaft." Berlin, Vol. XXI, April 1941.
- WONG, W. H. See V. K. TING
- World Power Conference. Power Resources of the World (Potential and Developed). Hugh Quigley, compiler. London, 1929.

- . Statistical Yearbook No. 3: Data on Resources and Annual Statistics for 1935 and 1936 . . . Frederick Brown, ed. London, 1938.
- WÜST, GEORG. Kuroshio und Golfstrom . . . *Veröffentlichungen des Instituts für Meereskunde*, Berlin, N.F.A., Heft 29, Mai 1936.
- YOUNG, A. MORGAN. Imperial Japan 1926-1938. New York, 1938.

NOTE ON MAPS

For a comprehensive list of standard maps of Japan, the reader is referred to the section on Japan in "A Selected Bibliography of Pacific Area Maps" by Clifford H. McFadden, with an introduction by R. B. Hall (Shanghai, 1940, Institute of Pacific Relations). In addition to the governmental series mentioned there, a "Japanese Naval Air Chart" in 41 sheets, covering the area from Kamchatka to Formosa, including Korea and the China Coast, has been published by the Japanese Imperial Hydrographic Office, corrected to December 1940.

Of the maps generally available, perhaps the most useful is "Japan and Adjacent Regions," including Korea, Manchuria, and Formosa, published by the *Kokusai Bunko Shin-kokai* (Society for International Cultural Relations) in Tokyo in 1937. It is drawn to the scale of 1 : 2,000,000 and reproduced with hypsometric tints. An index to this map is provided by "A Gazetteer of Japanese Place Names in Characters and in Romaji Script Giving Latitudes and Longitudes" compiled by Stanley Gerr (Cambridge, Mass., 1942).

Two small atlases devoted to Japan may also be useful for general reference. Martin Schwind's "Kleiner Atlas von Japan" (Tokyo, Deutsche Gesellschaft für Natur- und Völkerkunde Ostasiens, 1939) contains regional maps, most of them on the scale of 1 : 1,600,000, city plans, and maps, mostly on the scale of 1 : 10,000,000, illustrating climatic conditions, geological and mineral formations, population distribution, and facilities for transportation by rail, sea, and air. "The Newest Atlas of Japan," compiled by the Sanseido Publishing Company (Tokyo [1934]), contains a number of detailed maps illustrating political divisions, physical geography, and land use. All the names and explanatory matter are in Japanese.

The shores, ports, and sea routes of Japan proper are described in the United States Hydrographic Office's "Asiatic Pilot," Vol. II: "The Japanese Archipelago" (*H. O. No. 123*, Washington, 1930, and supplements), and the Hydrographic Office Charts cover the waters of southern Honshu, all Shikoku, northern, western, and southern Kyushu, western Hokkaido, some of the smaller islands, and all the opposite shore of the Asiatic mainland. The British Admiralty Charts cover the Japanese waters in their entirety. The respective indexes should be consulted for the scope of the several charts. The longer sea routes in the Pacific Ocean are indicated in Philip's "Mercantile Atlas of the World" (London [1936]).

INDEX

This index does not cover the List of References (pp. 93-98) or the details given in the Table of Contents.

- Abrasive materials, 33, 46
Abukama Highland, 9
Abukama Lowland, 11
Abuta mine, 44
Africa, South, 74, 76
Agano River, 42
Agriculture, 5, 6, 10-12, 15-19, 23-29, 47, 61, 69
Ainu aborigines, 86
Air routes, Pacific area, 1
Akaiishi Mountains, 9
Akita Observatory, 17
Akita Prefecture, 39, 52
Alaska, Bases, 2
Alcuteian Islands, 1, 2, 4, 8
Allen, G. C., 60, 66, 69
Alps, Japanese. *See* Hida Mountains
Aluminum, 46
Alunite, 46
Antarctic whalers, 31
Antimony, 46
Aquiculture, 28, 30, 31, 61
Areas, Japan proper, 5, 7; Japanese Empire, 7; Western Pacific countries, 53. *See also* Land use areas
Argentine Republic, Japanese trade, 76
Ariake-no-umi, 12
Asahigawa Observatory, 16, 17
Asbestos, 33, 46
Asia, East, 14, 34, 39, 41, 89, 91.
Asphalt, 33, 41, 46
Atmospheric pressure, 15
Australia, Area and population density, 53; Bases, 3; Coal, 34; Iron, 43-46; Japanese immigration, 54; Japanese investment in, 84; Japanese trade, 74-76, 82; Power resources, 41, 43; Sailing distances, 1, 3, 4
Bai-u rains, 15
Bamboo trees, 19-22
Bases, Naval and air, in the Pacific, 1-4, 10
Bauxite, 46
Beans and peas, 24, 25, 77
Bering Sea, Japanese fishing grounds, 31
Birth rate, 48, 49, 54, 55
Biwa (Omi) Basin, 12
Bonin Islands, 2, 3, 87
Boreal forest zone, 20, 21
Borneo. *See* British Borneo
Boycotts, 45, 83
Brazil, Japanese immigration, 54; Japanese investment in, 84
British Borneo, Coal, 34; Iron, 43; Japanese occupation, 88; Petroleum, 39, 40
British Colonial Empire, Japanese trade negotiations, 82
British India. *See* India
British Malaya. *See* Malaya
Building materials, 20, 33, 46
Burma, Japanese occupation, 88; Petroleum, 39; Sailing distances, 2-4
Camphor trees, 19, 20
Canada, Bases, 3; Japanese trade, 74, 76, 82
Caroline Islands, 3. *See also* South Sea Islands under Japanese Mandate
Cartels, 35, 60, 66
Cement, 6, 46, 59, 64, 69
Central Mountain Range, 11
Censuses of population, 47-51, 53, 54, 60-62
Cereal cultivation, 17-19, 23-29
Chemical industries, 6, 33, 46, 62, 63, 65, 71
China, 82, 90; Area and population density, 53; Bases, 3; Coal, 34, 35, 38; Industry, 65; Iron, 43-46, 59; Japanese investment in, 84; Japanese occupation, 87, 88; Japanese trade, 48, 74-79, 81, 89; Petroleum, 40, 41; Power resources, 41, 43
China clay, 33, 46
Chishima Islands. *See* Kurile Islands
Chromium, 46
Chubu (geographical region), 6, 7
Climate, 5-7, 13-19, 28, 29
Coal, 6, 7, 33-38, 42, 46, 59, 69, 76
Coke, 33, 35, 38, 59
Commerce. *See* Trade
Conservation, Forests, 20-22
Constitution of 1889, 92
Cotton, 57-61, 64-66, 69, 73, 74, 76, 77, 80, 89
Coöperative movements, Agricultural, 24
Copper, 46
Crocker, W. R., 56
Crops. *See* Agriculture
Currents. *See* Ocean currents
Cyclonic storms, 13-15, 18
Death rate, 47-49
Diet, 20, 26, 31, 32, 52
Discount rate, 66
Double cropping, 5, 6, 17, 18, 19, 23-29
Dry-field farming, 24-29
Earthquakes, 8
East China Sea, 31
East Indies, 8, 54. *See also* British Borneo; Netherlands Indies
Echigo Plain, 11, 39
Efficiency, Industrial, 57, 58, 65-69

- Egypt, Japanese trade, 74, 76, 82
 Electricity. *See* Hydro-electric power
 Elements, Climatic, 15
 Elevation, Influence on climate, 15, 18
 Emigration, 52, 54
 Emperor, Position of, 86, 91, 92
 "Estimated Actual Population," 48
 Exports *See* Trade
- Families, Agricultural, 23, 24, 26, 27; Industrial workshops, 56, 60, 66, 85; Population policy, 55. *See also* Part-time workers
 Fertilizer, 23-25, 33, 46, 59
 Finland, Japanese trade, 76
 Fishery industries, 6, 30-32, 59, 61
 Flax cultivation, 5, 26
 Fluorspar, 46
 Foehn winds, 17, 18
 Fog, 16, 18
 Foodstuffs, Processed, 62, 64, 71, 72, 75, 80, 81, 89. *See also* Fishery industries
 Foreign trade. *See* Trade
 Forests, 5-7, 18-22
 Formosa, 7, 8; Area and population density, 53; Bases, 3, 4; Coal, 36, 38; Fishing, 31; Japanese annexation, 2, 87; Japanese residents, 54; Petroleum, 39, 40; Rice exports to Japan, 28; Trade, 38, 40, 70, 71, 88
 Fossa Magna, 8, 9, 10
 France, 56, Bases in the Pacific, 3; Japanese trade, 74, 75, 79. *See also* Indo-China
 Freight rates. *See* Transportation
 Frost-free seasons, 16-18
 Fruit cultivation, 17, 18, 24, 29
 Fuel, Domestic, 20-22, 35, 41; Industrial, 5-7, 33-43, 46, 59, 65, 66, 71, 73
 Fuji Mountains, 9
 Fuji River, 42
 Fujiyama, 9
 Fukui classification of climatic regions, 15-19
 Fukushima Valley, 11
 Fushun, Manchuria, Coal mine, 38; Shale oil, 40
 Gainfully occupied population, 21, 23, 30, 31, 56, 60-62
Gangi, 17
 Gasoline, 35, 39, 40, 41
 General industry. *See* Manufacturing industries, General
Genya. *See* Grassland
 Geology, 8-12
 Germany, 56, 76, 78, 82, 87
 Gold, 33, 46, 65, 83, 84
 Gold standard. *See* Yen, Value of
 Government, Distribution of power in, 92
 Governmental economic activities, Agriculture, 24-28; Forests, 20-22; Hydro-electric power, 42; Industries, 56, 57, 60; Occupied territory, 88; Population policy, 52, 54, 55; Trade negotiation, 82. *See also* Tariffs; Taxation; Subsidies
 Graphite, 46
 Grassland, 20, 21, 26
 Great Britain, 56, 87, 90; Bases in the Pacific, 3; Japanese trade, 74-79; Wholesale price level, 71
 Great-circle courses, 1
 "Greater East Asia Co-Prosperity Sphere," 89, 91
 Guam, Bases, 3; Japanese occupation, 88
 Gypsum, 33, 46
- Hainan, Bases, 3; Japanese occupation, 88
 Hakodate, 59
 Hall, R. B., 89
 Hawaii, Bases, 2; Japanese immigration, 54. *See also* Honolulu; Pearl Harbor
 Heavy industries, 33, 35, 46, 56-69, 74-77, 81, 82, 85, 89
 Hemp, 26, 59, 89
 Hida Mountains (Japanese Alps), 10, 51
 Hidaka Mountains, 9, 11
 Hideyoshi, 86
 Hokkaido, Agriculture, 23, 28; Climate, 13, 15-17; Coal, 5, 6, 36, 37; Forests, 20-22; Geographical region, 5; Geology, 8, 9, 11; Immigration, 50, 54; Industries, 59; Iron, 44; Petroleum, 39; Physiography, 9; Plains 10, 11
 Hongay coal mine, Indo-China, 38
 Hong Kong, Japanese occupation, 88
 Honolulu, Sailing distances, 1, 4
 Hou, T. F., 45
 Humidity, 15
 Hydro-electric power, 6, 20, 35, 41-43, 66
- Imports. *See* Trade
 India, Bases, 3; Coal, 34; Iron, 43-45; Japanese trade, 74-78, 82; Manufacturing, 65; Petroleum, 39; Power resources, 41, 43; Wholesale price level, 71
 Indo-China, 86; Area and Population density, 53; Bases, 3; Coal, 34, 38; Iron, 43; Japanese occupation, 88; Japanese trade, 76; Power resources, 41; Sailing distances, 2
 Industrial location, 5-7, 10, 59
 Industrial Japan, 56-69. *See also* Mineral and power resources; Foreign trade
 Inland Sea, 6, 10-12, 18, 29, 37
 Inner Zone, Northern (physiographic region), 9, 11
 Inner Zone, Southwestern (physiographic region), 10, 11, 12
 Investment, Japanese, 45, 56, 60, 63, 84, 88, 89, 91
 Invisible trade, 83, 84
 Iron and steel, 33, 43-46, 60, 61, 64-68, 74, 75, 77-79. *See also* Heavy industries

- Iron sands, 44, 45
 Ise (Owari) Bay, 11
 Ishikari coal field, 36, 37
 Ishikari River, 11
 Ishikari-Yufutsu Plain, 9, 11
 Island arcs, 8
 Italy, Japanese trade, 76
- Japan, Sea of, 11, 13, 15, 16, 18, 29, 39
 Japanese Alps (Hida Range), 10, 51
 Japanese Current. *See* Kuroshio Current
 Japanese Empire, 7, 34, 38, 39, 43, 45, 53, 54, 71, 83, 86-92
 Joban coal field, 37
- Kagoshima Observatory, 16-19
 Kaiping coal mine, China, 35, 38
 Kamaishi mining area, 44, 59
 Kamchatka Peninsula, 8, 31
 Kanazawa Observatory, 17
 Karafuto, 7, 8; Area and population density, 53; Coal, 36, 38; Fisheries, 31; Immigration, 52, 54; Japanese residents, 54; Trade statistics, 70-72, 74, 76, 78, 79
- Kinai District, 51
 Kinki District, 6, 12, 51
 Kiso River, 42
 Kiss, George, Notes on a Map of Population Changes in Japan, 50, 51
 Kitakami Highland, 9, 44
 Kitakami Lowland, 11
 Kobe, 6, 36, 42, 50, 51, 59
 Kochi Observatory, Shikoku, 15
 Kokura, 59
 Konoye, Prince, 91
 Korea, 7, 86, 91; Area and population density, 53; Bases, 3; Coal, 36, 38; Fisheries, 31; Immigration, 54; Iron, 44, 45, 57, 59; Japanese annexation, 2, 87; Japanese residents, 54; Minerals, 46; Petroleum, 40; Power resources, 41; Rice exports to Japan, 28; Trade, 38, 40, 45, 46, 70, 71, 81, 88
 Korea (Tsushima) Strait, 13, 86
 Koriyama Lowland, 11
 Kublai Khan, 86
 Kure, 10
 Kurile Islands, 2, 3, 7-9, 87
 Kurobe River, 42
 Kuroshio Current, 5, 13, 14, 18
 Kutchan mine, 44, 59
 Kwanto mountain area, 6, 9
 Kwanto (Tokyo) Plain, 6, 11, 29
 Kwantung Leased Territory, 7; Area and population density, 53; Fisheries, 31; Japanese acquisition, 2, 87; Japanese residents, 54; Japanese trade, 40, 41, 74, 77, 81
 Kyoto, 6, 50, 51, 59, 86
 Kyoto Basin. *See* Yamashiro Basin
 Kyushu, 5, 6; Agriculture, 29; Climate, 14, 18, 19; Coal, 6, 36, 37; Forests, 21; Industry, 59; Physiography, 8-10, 12, 13; Population, 50, 51
- Labor, Industrial, 56-69. *See also* Gainfully occupied population; Part-time workers; Wage rates
 Ladrones. *See* Marianas Islands
 Land tenure, 21, 22, 26, 27, 42
 Land use areas, 5-7, 10, 20-23. *See also* Regions
 Landforms, 7-12
 Lead, 46
 League of Nations, 71, 79, 80, 83, 88, 90
 Lend-Lease aid to China, 90
 Limestone, 33, 46
 Livestock, 24, 26, 28, 29
 Lowland areas, 10-12
 Lyuchyu Islands, 5, 8, 87
- Machinery industry. *See* Manufacturing industries, General; Heavy industries
 Magnesite, 46
 Malaya, Area and population density, 53; Bases, 3, 4; Iron, 43, 44, 45, 57; Japanese occupation, 88; Japanese trade, 76; Power resources, 41; Sailing distances, 2, 3
 Manchukuo, German-Japanese trade agreement, 82; Japanese residents, 54. *See also* Manchuria
 Manchuria, Area and population density, 53; Bases, 3; Coal, 34, 38; Immigration, 52, 54; Iron, 43-47; Japanese occupation, 2, 58, 88, 90; Japanese investment in, 45, 84, 89; Japanese trade, 38, 40, 41, 45, 74-76, 81; Magnesite, 46; Petroleum, 40, 41
 Manganese, 33, 46
 Manufacturing industries, General, 6, 33, 35, 41, 46, 56-69
 Marianas Islands, Bases, 3. *See also* Guam; South Sea Islands under Japanese Mandate
 Marshall Islands, Bases, 3. *See also* South Sea Islands under Japanese Mandate
 Matsumoto Observatory, 15-17
 Meiji government, 48, 57
 Mercury, 46
 Metal industries. *See* Heavy industries
 Mica, 33, 46, 89
 Miike (town), 59
 Miike coal mine, 38
 Miller Cylindrical Map Projection, 1
 Mineral and power resources, 33-46
 Moji, 36, 59
 Molybdenum, 33, 46
 Mongolia, 13
 Monsoons, 13, 17, 18
 Motor oil. *See* Gasoline
 Mulberry cultivation, 6, 17, 18, 25, 26, 29
 Muroran, 44, 59
 Mutsu Plain, 11

- Nagoya, 6, 50, 51, 59
Nara Basin. *See Yamata Basin*
 Nasu classification of agricultural regions, 28, 29
 Natural gas, 34
 Netherlands Indies, 86; Area and population density, 53; Bases, 3; Coal, 34; Iron, 43, 45; Japanese occupation, 88; Japanese trade, 40, 45, 74-77, 82; Petroleum, 39, 40; Strategic problems, 2-4
 New Zealand, Area and population density, 53; Bases, 3; Coal, 34; Iron, 43; Japanese trade, 76
 Nichiryo Fishery Co., 30, 31
 Nickel, 46
 Niigata (city), 51
 Niigata Observatory, 16, 17
 Niigata Plain. *See Echigo Plain*
 Niigata Prefecture, 37, 52
 Nippon Petroleum Co., 39
 Nitrates, 33, 46
 Norway, 76
 Ocean currents, 5, 13, 14, 16, 18
 Oil, Mineral. *See Petroleum*
 Oil, Vegetable, 64, 77
 Okhotsk Current. *See Oyashio Current*
 Okhotsk Sea, Japanese fishing grounds, 31
 Omi Basin. *See Biwa Basin*
 Omuta, 59
 Onada coal field, 37
 Osaka (city), 6, 36, 42, 50, 51, 59
 Osaka Bay, 11, 12
 Osaka Observatory, 15-18
 Osaka (Settsu) Plain, 12, 51
 Otaru, 59
 Ou (geographical region), 5, 51
 Outer Zone, Northern (physiographic region), 9, 11
 Outer Zone, Southwestern (physiographic region), 9, 12
 Owari Bay. *See Ise Bay*
 Oyashio Current, 5, 13, 14, 16
 Pacific Folded Mountains, 9
 Pacific Ocean, 1-6, 8, 10, 11, 13, 16, 29-32, 87, 88
 Paddy fields, 24-29
 Palau Islands. *See Pelew Islands*
 Palm trees, 19
 Part-time workers, 21, 23, 28, 31, 60, 85
 Pearl culture, 31
 Pearl Harbor, Sailing distances, 1, 3
 Pelew Islands, Bases, 3. *See also* South Sea Islands under Japanese Mandate
 Perry, Commodore, 47, 87
 Pescadores Islands, Bases, 3; Japanese annexation, 87
 Petroleum, 33, 34, 38-41, 65, 73, 76, 77, 87
 Philippine Islands, 2, 3, 8; Area and popula-
- tion density, 53; Coal, 34; Iron, 43-45; Japanese immigration, 54; Japanese investment in, 45, 84, 88; Japanese occupation, 88; Japanese trade, 45, 74, 76, 82
 Phosphates, 33, 46
 Physiography, 8-12
 Plains areas. *See Lowland areas*
 Platinum, 46
 Plum rains. *See Bai-u rains*
 Population, 5-7, 47-55. *See also* Gainfully occupied population
 Port Arthur, 87
 Potash minerals, 33, 46
 Pottery and porcelain, 6, 33, 46, 57, 59, 60, 62, 64, 75, 80, 81
 Poultry, 26, 28
 Power resources, 33-43
 Precipitation. *See Climate*
 Prefectural boundaries (map), 52
 Prices, Agricultural products, 27, 28, 71; Coal, 38; Electric power, 42; Gasoline, 40; Iron, 45, 46; Metal products, 67, 68; Wholesale commodities, 71, 82
 Producing centers, Coal, 36, 37; Hydro-electric power, 42; Iron, 44, 45; Petroleum, 39. *See also* Regions, Agricultural; Regions, Forest; Industrial location
 Production, Agricultural, 25, 28; Fishery industries, 30-32; Hydro-electric power, 41; Manufacturing industries, 56, 63-66; Mineral materials, 35, 39, 40, 46
 Puget Sound, Sailing distance, 1
 Pyrites, 46
 Rainfall. *See Climate*
 Rainy seasons, 15
 Raw silk. *See Silk*
 Rayon, Pulp, 20, 73, 76; Tissues, 58, 60, 62, 64, 66, 74, 75, 80
 Refractories, 33, 46
 Regions, Agricultural, 28, 29; Climatic, 15-19; Forest, 20, 21; Geographical, 5-7; Physiographic, 8-10
 Reserves, Coal, 34, 35, 38; Copper, 46; Hydro-electric power, 41; Iron ore, 43, 44; Petroleum, 38, 39; Sulphur, 46
 Rice cultivation, 5-7, 11, 17-19, 23-29
 Rock formations, 9-12
 Rubber, 58, 60, 62, 64, 73, 76, 89
 Rural population, 5, 6, 28, 29, 49-51
 Russia, Asiatic. *See* Sakhalin; Siberia; Soviet Union
 Ryukyu Islands. *See* Lyuchyu Islands
 Sagami River, 42
 Sailing distances between Pacific ports, 1, 2, 4
 Sakhalin, 39, 40, 43, 87
 Samoa, Bases, 2; Sailing distances, 3
 San Francisco, Sailing distances, 1
 Sansom, Sir George B., 68, 79

- Sea routes, North Pacific Ocean, 1, 2
Sendai (city), 9
Sendai Bay, 11
Sendai Observatory, 16, 17
Sericulture. *See* Silk
Setouchi, Central, 12
Settlement, 5-7, 10-12, 52, 54, 86
Settsu Plain. *See* Osaka Plain
Shantung Province, China; Transfers of former German holdings, 87
Shikko petroleum field, Formosa, 39
Shikoku, 5, 6; Agriculture, 29; Climate, 15, 18, 19; Lack of coal fields, 36; Population changes, 50, 51; Physiography, 9, 10, 12
Shimonoseki Observatory, 16-18
Shimonoseki Strait, 6
Shinano River, 42
Shipbuilding, 59, 62. *See also* Heavy Industries
Shipping. *See* Supply lines
Shizuoka Prefecture, 25, 52
Siam. *See* Thailand
Siberia, Coal, 34; Fishing grounds, 31; Iron, 43, 45; Japanese intervention, 87; Japanese trade, 45, 74, 76; Petroleum, 39; Power resources, 41, 43; Strategic position, 2. *See also* Sakhalin; Soviet Union
Silk, 6, 23, 25, 28, 29, 57-61, 64, 73-75, 80, 89. *See also* Textile industries
Silver, 33, 46
Singapore, Sailing distances, 3, 4
"Six Great Cities," 6, 50
Small-scale production, Agriculture, 23, 24; Fishing, 30; Hydro-electric power, 42; Manufacturing, 56, 60, 85; Petroleum wells, 39; Timber, 22
Snowfall, 15-18
South Manchurian Railway Zone, 7; Area and population density, 53; Japanese acquisition, 87
South Sea Islands under Japanese Mandate, 3, 7, 8; Area and population density, 53; Fisheries, 31; Phosphate rock, 46; Japanese acquisition, 2, 87; Japanese residents, 54; Trade statistics, 71
Soviet Union, 3, 4, 56, 87. *See also* Sakhalin; Siberia
Spratly Islands, 3, 88
Standard of living, 28, 52, 54, 85. *See also* Diet
Steel production. *See* Heavy industries; Iron and steel
Stones, Semi-precious, 33, 46
Straits Settlements. *See* Malaya
Subsidies, 26, 39, 40, 65
Substitutes for mineral materials, 46, 65
Sulphur, 33, 46
Supply lines, Strategically important to Japan, 2-4
Sydney, Australia, Sailing distances, 1, 4
Synthetic gasoline. *See* Gasoline
Taiwan. *See* Formosa
Tariffs, 28, 57, 58, 71, 80, 82, 88, 90; Copper, 46; Iron, 45; Manufactured articles, 65; Petroleum, 39, 40
Taxation, 40, 58, 65
Tea cultivation, 5, 18, 24, 25, 29
Tegengren, F. R., 45
Temperature. *See* Climate
Tenancy, 26-28
Tenryu River, 42
Terms of foreign trade, 79-83
Territorial expansion, 53, 54, 58, 86-92
Textile industries, 6, 33, 57-69, 71, 73-77, 82, 83, 89
Thailand (Siam), 86, Area and population density, 53; Bases in the Pacific, 3; Iron, 43; Japanese occupation, 88; Power resources, 41
Timber, 21, 22
Tin, 46, 89
Tobata, 59
Tokugawa shogunate, 47, 57, 86
Tokyo (city), 6, 14, 29, 36, 37, 42, 50, 51, 59
Tokyo Observatory, 15-18
Tokyo (Kwanto) Plain, 6, 11, 29
Tone River, 42
Trade, 57, 58, 61, 62, 64, 65, 67-85, 90; Coal, 38; Fishery products, 30, 32; Forest products, 22; Iron, 45; Copper 46; Manufactured articles, 62, 64, 65; Metal and machinery, 67-68; Petroleum products, 40
Trading countries, 74-79
Transportation, 7, 29-31, 35, 36, 41, 65, 66, 83. *See also* Air routes; Sea routes
Tsukushi Plain, 12
Tsushima Current, 13, 17, 18. *See also* Kuroshio Current
Tsushima Strait. *See* Korea Strait
Tungsten, 46, 89
Typhoons, 14, 15, 18

U. S. S. R. *See* Sakhalin; Siberia; Soviet Union
Ube coal field, 37
United States, Bases in the Pacific, 2, 3; Coal, 35, 38; Far Eastern policy, 89, 90; Hydroelectric power, 41; Iron, 44-46, 56; Japanese immigration, 54; Japanese trade, 40, 45, 74-80, 82, 90; Petroleum, 39, 40; Wholesale price level, 71
Urbanization, 5, 49-51
Uyeda, Teijiro, 61, 81

Vanadium, 46
Vegetable cultivation, 24, 25, 29
Volcanism, 9, 10
Volcanoes, 8, 9, 11

- Wages, Farm laborers, 28; Forest workers, 22; Factory workers, 84, 85
Wakamatsu, 36, 59
Wakasa Bay, 12
Wake Island, Bases, 3; Japanese occupation, 88
War Industries, 58, 59, 65. *See also* Heavy industries
Water power. *See* Hydro-electric power
Whaling, 31
Winds, 13-19
Wood, 20-22, 59, 62, 76
Wool, 26, 57, 60, 64, 65, 73, 74, 76. *See also* Textile industries
Yahata, 6, 36, 59
Yamashiro (Kyoto) Basin, 12
Yamata (Nara) Basin, 12
Yampi Sound area, Australia, 45
Yangtze Valley, 13
Yawata. *See* Yahata
Yellow Sea, 31
Yen, Value of, 22, 28, 36, 38, 58, 65, 66, 79-82
Yen bloc, 81
Yodo River, 42
Yokohama, 1, 2, 6; 36, 42, 50, 51, 59
Yokohama Specie Bank, 71, 79, 80
Yoshino Rift Valley, 12
Yufutsu Plain. *See* Ishikari-Yufutsu Plain
Zaibatsu, 60.
Zinc, 46